

The *Ficus* species (*Moraceae*) of Madagascar and the Comoro Islands

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Summary : A taxonomic revision of the genus *Ficus* in Madagascar and the Comoro Islands is presented ; twenty-five species are recognized. Five new taxa are described : *F. ampana* C. C. Berg, *F. humbertii* C. C. Berg, *F. karthalensis* C. C. Berg, *F. madagascariensis* C. C. Berg, and *F. antandronarum* (H. Perrier) C. C. Berg subsp. *bernardii* C. C. Berg. Four new combinations are made : *F. antandronarum* (H. Perrier) C. C. Berg, *F. pachyclada* Baker subsp. *arborea* (H. Perrier) C. C. Berg, *F. reflexa* Thunb. subsp. *aldabrensis* (Baker) C. C. Berg, *F. reflexa* Thunb. subsp. *sechellensis* (Baker) C. C. Berg.

Résumé : Révision taxonomique des *Ficus* de Madagascar et des Comores ; 25 espèces sont reconnues. Cinq taxa nouveaux sont décrits ici : *F. ampana* C. C. Berg, *F. humbertii* C. C. Berg, *F. karthalensis* C. C. Berg, *F. madagascariensis* C. C. Berg et *F. antandronarum* (H. Perrier) C. C. Berg subsp. *bernardii* C. C. Berg. Quatre combinaisons nouvelles sont proposées : *F. antandronarum* (H. Perrier) C. C. Berg, *F. pachyclada* Baker subsp. *arborea* (H. Perrier) C. C. Berg, *F. reflexa* Thunb. subsp. *aldabrensis* (Baker) C. C. Berg et *F. reflexa* Thunb. subsp. *sechellensis* (Baker) C. C. Berg.

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The first six species of *Ficus* for the Madagascar flora region (GOOD, 1974) were described by THUNBERG (1786) and LAMARCK (1788). Many new species were added by BAKER (1877, 1883, 1885, 1887, 1890), most of them based on collections made by BARON in Madagascar and a few based on material from neighbouring islands. Some more species were added by BAILLON (1895) for Madagascar and by CORDEMOY (1895) for La Réunion. Two species were described by WARBURG (1894) from material collected in the Comoro Islands. In 1928 PERRIER DE LA BÂTHIE revised the genus for Madagascar. This study served as a base for the treatment of *Ficus* in the Flora of Madagascar (1952). PERRIER DE LA BÂTHIE reduced many of BAKER's names to synonyms or to varieties and described a few new species as well as a number of new varieties. Several of these taxa proved to be heterogeneous, sometimes even comprising material from different subgenera. Relations of the Madagascan flora with floras of other regions in Africa were neglected. The weak points in the work of PERRIER DE LA BÂTHIE caused difficulties in identifying collections, which led to the present revision, carried out within the framework of floristic studies of *Ficus* for various parts of continental Africa (Cameroun, Gabon, Togo, Tropical East and Southern Africa) and for the Mascarene Islands.

The species are arranged according to CORNER's classification of *Ficus* (1965) and within *Galoglychia* according to a subdivision proposed by BERG (1986).

For the Madagascar floristic region thirty *Ficus* species are presently recognized, and for the whole African floristic region 105 species. Four species are found both in continental Africa and in the Madagascar floristic region : *F. lutea*, *F. polita*, *F. sycomorus*, and *F. trichopoda*, all occurring in Madagascar, *F. lutea* and *F. sycomorus* also on other islands. Eighteen species are endemic to Madagascar. Five species are also found in other parts of the Madagascar region : *F. antandronarum* (with subsp. *bernardii*), *F. bojeri*, *F. pachyclada*, *F. reflexa*, *F. rubra*, and *F. tiliifolia*.

The Comoro Islands have two endemic taxa : *F. karthalensis* and *F. antandronarum* subsp. *bernardii* ; *F. bojeri* and *F. pachyclada* (vel aff.), *F. rubra*, and *F. tiliifolia* occur also on other islands, and *F. lutea* and *F. sycomorus* both on the continent and on other islands.

The indigenous flora of the Mascarene Islands comprises five *Ficus* species of which *F. lateriflora* and *F. mauritiana* are endemic. *F. densifolia* also occurs in the Seychelles, *F. reflexa* and *F. rubra* are also in the other (groups of) islands.

The Seychelles have five indigenous taxa of *Ficus* : *F. bojeri*, *F. densifolia*, *F. lutea*, *F. rubra*, and the endemic *F. reflexa* subsp. *seychellensis*.

The Aldabra Islands have three indigenous taxa of *Ficus* : *F. lutea*, *F. reflexa* subsp. *aldabrensis*, and *F. rubra* (cf. FOSBERG & RENVOIZE, 1980).

The composition of the *Ficus* flora of the Madagascar region differs from that of the African continent by a stronger representation of subdivisions of *Ficus* centered in the Asian-Australasian region. Most of the *Ficus* species of the Madagascar flora region are adapted to rather dry conditions (dry forest, savanna) and/or belong to sections or subsections in which this at least holds for many species.

FICUS subg. FICUS sect. SYCIDIUM Miq.

Terrestrial, dioecious trees or shrubs ; sap watery. Leaves (almost) distichous (and alternate) or subopposite, margin often dentate, when juvenile often \pm deeply pinnately or palmately incised ; glandular spots in the axils of the basal lateral veins beneath (or in *F. pachyclada* on the base of the midrib) ; stipules lateral to semi-amplexicaul. Figs in the leaf axils or on the older wood, pedunculate, usually with a bract at the base of the peduncle and with 2-4, usually disperse (peduncular) bracts, several bracts on the outer surface of the receptacle, ostiole circular with several ostiolar bracts visible, only the lower ostiolar bracts descending ; interfloral bracts lacking, receptacle inside setose ; staminate flowers usually near the ostiole, tepals (2-)3-6, free, stamen(s) 1 (or 2), pistillode present ; seed and gall flowers distinct, tepals 1-6, free, stigma 1, truncate and infundibuliform ; pedicels, (margin of the) tepals and (usually also the) style hairy ; endocarp body released ; wall of the fig in fruit soft, red, orange, or yellow.

Section *Sycidium* comprises ca. 105 species, most of them in Asia-Australasia, four in continental Africa, and six in the Madagascan floristic region (five of them in Madagascar).

In contrast to the other sections (or subgenera) represented in Madagascar and the Comoro Islands, the delimitation of the taxa of section *Sycidium* recognized in the present

treatment is in most cases somewhat doubtful. Except for the *Sycidium* species of the African continent, the taxa of the Madagascar flora region are not clear-cut because of the occurrence of specimens with transitional features, suggesting the possibility of hybridization.

1. *Ficus pachyclada* Baker

J. Linn. Soc., Bot. 22 : 522 (1887) ; H. PERRIER, Arch. Bot. Bull. Mens. 2 : 173 (1928), and in HUMBERT, Fl. Madagascar, Moracées : 68, tab. 13 (1952).

TYPE : *Baron 4496*, Madagascar, without locality (holo-, K ; iso-, P).

Tree up to 25(-35) m tall. Leafy twigs 1.5-4 mm thick, usually scabrous, whitish-hispidulous or sometimes to brownish-hirtellous, the bases of the hairs not swollen, when dry (red-)brown, periderm (of older parts) flaking off. Leaves in spirals ; lamina cordiform to ovate, sometimes subobovate or elliptic, (2-)4.5-14(-22) × (1.8-)4-8(-14) cm, equal-sided (or unequal-sided), chartaceous, apex short-acuminate, base cordate to subcordate (to rounded to obtuse), margin crenate-dentate ; both surfaces scabrous, ± densely hispidulous, the lower surface hirtellous or subhirtellous to puberulous as well ; venation plane above, (very) prominent beneath, lateral veins 2 × (3-)4-6, (main) basal pair ± distinctly branched, reaching the margin at about the middle of the lamina, below the main basal pair of lateral veins 1-3 pairs of minor basal veins, these usually on both sides of the midrib not equal in number and position, tertiary venation ± scalariform, in small leaves reticulate ; glandular spot present in the axils of the (main) basal lateral veins, mostly inconspicuous ; petiole (1-)2.5-5(-13) cm long, hispidulous ; stipules 0.1-0.5 cm long, hispidulous, caducous.

Figs usually solitary in the leaf axils or below the leaves on previous season's growth ; peduncle 0.5-2(-2.5) cm long, 1-2 mm thick, hispidulous ; peduncular bracts 3, ovate, ca. 1 mm long ; receptacle subglobose to subpyriform, when dry ca. (0.8-)1-1.5 cm in diameter, hispidulous, at maturity red ; ostiole ca. 0.5-0.6 mm in diameter, prominent.

Staminate flowers also among the gall flowers, subsessile or up to 3 mm long pedicellate ; tepals 4, free, oblanceolate to subspathulate, 1.5-2 mm long ; filament up to 1 mm long, anther 0.8-1 mm long, apiculate, apiculus reflexed. Pistillate flowers : tepals 4-5(-6), subspathulate to oblanceolate, 1.5-2 mm long ; seed flowers sessile or up to 3 mm long pedicellate, style (including stigma) ca. 1.5-2 mm long ; gall flowers sessile or up to 3(-3.5) mm long pedicellate, style (including stigma) ca. 0.4-0.5 mm long. Fruits ellipsoid to ovoid, ca. 1-1.2 mm long ; "gall fruits" ellipsoid to subglobose, ca. 1 mm long.

In juvenile specimens the lamina is often subpalmately lobed to parted, the segments and their first divisions may be lobed as well. Some collections (e.g., *Humbert 13237*) are hardly hirtellous on the lamina beneath, therefore hardly distinguishable from forms of *F. bojeri* from the Comoro Islands (e.g., *Ducatillon 422* and *443*). In this case the wider ostiole can serve to tell *F. pachyclada* apart from *F. bojeri*. The form of *F. bojeri* found in Madagascar can be readily distinguished from *F. pachyclada*.

a. Subsp. **pachyclada**

— *Ficus broussonetiifolia* BAKER, J. Linn. Soc., Bot. 25 : 346 (1890) ; H. PERRIER, Arch. Bot. Bull. Mens. 2 : 173 (1928). Type : *Baron 5691*, Madagascar, Androna (holo-, K ; iso-, P).

Leafy twigs 2-6 mm thick. Lamina 4-14(-22) × 2-8(-14) cm ; lower surface sparsely hispidulous and hirtellous (to subhirtellous) ; tertiary venation for the greater part scalariform, the smaller veins mostly very prominent. Receptacle when dry up to 1.5 cm in diameter.

DISTRIBUTION : Madagascar (West to Central) ; in (dry) forest, often along rivers, or in periodically inundated places ; at altitudes up to 1300 m ; probably also in the Comoro Islands (Grande Comore).

COLLECTIONS EXAMINED. — COMORO ISLANDS : *Boivin s.n.* ; *Bouton* (probably collection *Bojer*) *s.n.* (in P mixed with *F. bojeri*) ; *Loup 74*. — MADAGASCAR : *Baron 4496, 5691, 5762* ; *Boivin 2027 bis* ; *Capuron 22191-SF, 24833-SF* ; *Cours 396* ; *Decary 14287, 17966* ; *Humbert 6664 bis, 11326, 12420, 12924, 19912* ; *Léandri 3771* ; *Perrier de la Bâthie 225 bis, 10062, 10071, 11844, 13645, 13877, 14610, 15890 bis, 15911, 16787* ; *Poisson 72* ; *Seyrig 8, 813*.

The collections from the Comoro Islands (*Boivin, Bouton, Loup*) were made from juvenile specimens and their identity is not certain.

b. Subsp. **arborea** (H. Perrier) C. C. Berg, *comb. et stat. nov.*

— *Ficus soroceoides* BAKER var. *arborea* H. PERRIER, Arch. Bot. Bull. Mens. 2 : 168 (1928), and in HUMBERT, Fl. Madagascar, Moracées : 67, *tab. 12, fig. 4* (1952).

SYNTYPES : *Perrier de la Bâthie 9950* and *9957*, Madagascar, Analamazaotra Forest (P).

Leafy twigs 1.5-3 mm thick. Lamina 3-8 × 2-6 cm ; lower surface sparsely hispidulous and subhirtellous to puberulous ; tertiary venation predominantly (loosely) reticulate, the smaller veins slightly prominent to plane. Receptacle when dry up to 1 cm in diameter.

DISTRIBUTION : Madagascar (Central to East) ; in forest.

COLLECTIONS EXAMINED. — MADAGASCAR : *Cours 599* ; *Humbert 13237* ; *Perrier de la Bâthie 9950, 9957, 14610, 18334* ; *Serv. Forest. Madag. 2035, 5443* ; *Thouvenot 125*.

2. ***Ficus bojeri* Baker**

Fl. Mauritius and the Seychelles : 286 (1877).

TYPE : *Horne 342*, Seychelles, Mahe (holo-, K).

Tree up to 12 m tall. Leafy twigs 1-3 mm thick, usually very sparsely hispidulous and nearly smooth, when dry (yellowish-) brown, older parts often orange-brown or red-brown,

periderm of older parts flaking off. Leaves (tending to) distichous, often subopposite; lamina oblong to elliptic or to (sub)ovate, (3.5)10-17(-24) × (1.5)4-6.5(-10) cm, equal-sided or unequal-sided, chartaceous, apex (faintly) acuminate, base acute to rounded (or subcordate), margin (sub)entire or crenate to dentate towards the apex, sometimes sublobate; both surfaces scabridulous to scabrous, sparsely hispidulous; venation slightly prominent above, prominent beneath, lateral veins 2 × 5-9, basal pair unbranched or (faintly) branched, reaching the margin below or at the middle of the lamina, sometimes smaller basal veins present below the main basal pair, tertiary venation partly scalariform; glandular spots in the axils of the basal pair of lateral veins, rather inconspicuous; petiole (0.5-)1-5 cm long, (0.5-)1-1.5 mm thick, sparsely hispidulous, and usually nearly smooth; stipules 0.2-0.5 mm long, minutely puberulous, caducous.

Figs solitary (or in pairs) in the leaf axils or just below the leaves, or several together on (often ± cushion-shaped clusters of 0.5-1 cm long) spurs on the older wood down to the trunk, subsessile or pedunculate; peduncle (0.3-)0.5-1.5 cm long, ca. 0.5 mm thick, hispidulous; peduncular bracts (ca.) 3, elliptic to ovate, ca. 1 mm long; receptacle (sub)globose, when dry ca. (0.6-)0.8-1.2 cm in diameter, hispidulous, at maturity red (?); ostiole ca. 1.5-3 mm in diameter, prominent.

Staminate flowers sessile (or pedicellate?); tepals 2 or 3 (or 4?), oblong to lanceolate, 1-1.5 mm long; anther ca. 0.7-0.8 mm long. Pistillate flowers: tepals 1-6, oblong to (sub)ovate, 1-1.5 mm long; seed flowers sessile or 1.7 mm long pedicellate; style (including stigma) ca. 0.5-1 mm long; gall flowers sessile or up to 1 mm long pedicellate, style (including stigma) ca. 0.3-0.4 mm long. Fruits ellipsoid to ovoid, ca. 1-1.2 mm long; "gall fruits" ellipsoid to subglobose, ca. 1 mm long.

DISTRIBUTION: Madagascar (prov. Diego Suarez and Nossi-Be) and Comoro Islands (Mayotte, Anjouan), also in the Seychelles; in forest (undergrowth) and in secondary growth, at low altitudes.

COLLECTIONS EXAMINED. — COMORO ISLANDS: *Blackburn s.n.*; *Boivin 3111, 3112, s.n.*; *Bouton* (probably coll. *Bojer*) *s.n.* (in *P.* mixed with *F. pachyclada*); *Capuron 18780-SF*; *Ducatillon 422, 443*; *Hildebrandt 1649*; *Humblot 1172*; *Lavanhie s.n.*; *Pobeguain 17*. — MADAGASCAR: *Boivin 2025/2*; *Cours 5564*; *Humbert 18881, 32578*.

The collections *Cours 5564*, *Humbert 18881* and *32578* from northern Madagascar (prov. Diego Suarez) are distinguished by the coarsely crenate to sublobate leaf margin.

The species is illustrated in *Fl. Madagascar, Moracées, tab. 10, fig. 6, 7* (1952).

3. *Ficus brachyclada* Baker

J. Linn. Soc., Bot. 20 : 259 (1883).

- *Ficus phanerophlebia* BAKER, *l.c.* 22 : 522 (1887); H. PERRIER, *Arch. Bot. Bull. Mens.* 2 : 166 (1928). Type: *Baron 4474*, Madagascar, without locality (holo-, K; iso-, BM, P).
- *F. soroceoides* BAKER var. *brachyclada* (BAKER) H. PERRIER, *l.c.* : 167 (1928), and in HUMBERT, *Fl. Madagascar, Moracées* : 67, *tab. 12, fig. 5* (1952).
- *F. soroceoides* BAKER var. *macrophlebia* H. PERRIER, *l.c.* : 167 (1928), and in HUMBERT, *Fl. Madagascar, Moracées* : 66 (1952). Lectotype: *Perrier de la Bâthie 10060*, Madagascar, Bemarivo River, Amborimay (P).

TYPE: *Baron 1100*, Madagascar, without locality (holo-, K; iso-, P).

Shrub or treelet up to 4 m tall. Leafy twigs 1.5-4 mm thick, brownish- (or partly whitish-) hispidulous to -hispid with hairs the bases of which are \pm strongly swollen (or hirtellous or sparsely hispidulous), when dry brown to greyish, periderm persistent. Leaves (in spirals to) distichous, mostly subopposite; lamina mostly subobovate (to obovate) oblong sometimes oblong to elliptic (or to lanceolate), (3.5-)10-17(-26) \times (1.5)4.5-7.5 cm, equal-sided, chartaceous, apex (sub)acuminate, base acute (to rounded), margin dent(icul)ate, sometimes pinnately lobed to parted; upper surface scabrous, sparsely hirtellous to hispidulous, lower surface scabridulous (to scabrous), densely hirtellous (or sparsely hispidulous); venation almost plane above, prominent beneath, lateral veins $2 \times (4-)6-10(-18)$, basal pairs unbranched, reaching the margin below the middle of the lamina, tertiary venation tending to scalariform; glandular spots (for the greater part) on the base of the midrib beneath, conspicuous; petiole 0.4-1.5 or 1-7 cm long, 1-2 mm thick, hispidulous; stipules 0.3-1 cm long, strig(ill)ose, or minutely puberulous, caducous.

Figs solitary or in pairs in the leaf axils or just below the leaves or several together on up to 2 cm long spur-like branchlets (the development of which already initiated in the leaf axils) on the older wood; peduncle 0.2-1 cm long, 0.5-1 mm thick; peduncular bracts (2 or) 3, ovate, 0.5-1 mm long or 2 or 3 bracts subtending the receptacle and then up to 3 mm long; receptacle globose, when dry 0.5-1 cm in diameter, hispidulous, at maturity red(dish) or red-brown; ostiole 1.5-3 mm in diameter, \pm prominent.

Staminate flowers sessile or up to 0.5 mm long pedicellate; tepals 4-6, spatulate to oblanceolate to linear, 1-2 mm long; filament up to 1 mm long, anther 0.4-0.5 mm long, often oblique. Pistillate flowers: tepals 4-6, oblanceolate to spatulate to linear, 1-3 mm long; seed flowers sessile or up to 2.5 mm long pedicellate, style (including stigma) ca. 1-1.5 mm long; gall flowers sessile or up to 1.5 mm long pedicellate, style (including stigma) ca. 0.3-0.8 mm long. Fruits ovoid to ellipsoid, ca. 1-1.2 mm long; "gall fruits" ellipsoid to obovoid, ca. 1.5-2.2 mm long, (usually) stipitate.

DISTRIBUTION: Madagascar (East to Central to North); in forest, at altitudes up to 1600 m.

COLLECTIONS EXAMINED. — MADAGASCAR: *Herb. d'Alleizette* 718M; *Baron* 1100, 4453, 4474; *Benoist* 1147; *Bernardi* 11989; *Capuron* 660-SF, 20020-SF; *Cours* 162, 3221, 3602, 18540; *Decary* 10590, 17123, 18049, 18278; *Herb. Jard. Bot. Tananarive* 2167; *Homolle* 69; *Humbert (et al.)* 6261, 6233, 17669, 18540, 22373, 22792, 24514, 31577; *Lam & Meeuse* 5910; *Perrier de la Bâthie* 9951, 9953, 10060, 10069, 10080, 14954, 15219, 16770, 17065; *Rakotozafy* 265; *Serv. Forest. Madag.* 1272, 1880, 2418, 3821, 5536, 5757, 7197.

4. *Ficus politoria* Lam.

Encycl. Bot. 2: 500 (1788), *non* LOUREIRO (1790) *nec* MOON (1824).

- *Ficus soroceoides* BAKER, J. Linn. Soc., Bot. 20: 258 (1883); H. PERRIER, Arch. Bot. Bull. Mens. 2: 116 (1928), and in HUMBERT, Fl. Madagascar, Moracées: 64, tab. 12, fig. 1-3 (1952). Type: *Baron* 1014, Madagascar, without locality (holo-, K; iso-, P).
- *F. longipes* BAKER, l.c.: 259 (1883); BAILLON in GRANDIDIER, Hist. Madagascar, Bot., Atlas 3: tab. 304 (1895). Type: *Baron* 1948, Madagascar, without locality (holo-, K; iso-, BM).
- *F. soroceoides* BAKER var. *longipes* (BAKER) H. PERRIER, l.c.: 168 (1928), and in HUMBERT, l.c.: 67 (1952).

- *F. xiphocuspis* BAKER, *l.c.* : 260 (1883) ; BAILLON in GRANDIDIER, *l.c.* : tab. 302 (1895) ; H. PERRIER, *l.c.* : 166 (1928). Syntypes : *Baron 1554* and *1646*, Madagascar, between Tankay and East coast (K).
- *F. claoxyloides* BAKER, *l.c.* : 260 (1883) ; BAILLON in GRANDIDIER, *l.c.* : tab. 303 (1895) ; H. PERRIER, *l.c.* : 166 (1928). Lectotype : *Baron 1074*, Madagascar, without locality (K ; iso-, P).
- *F. soroceoides* BAKER var. *ambongensis* H. PERRIER, *l.c.* : 168 (1928). Type : *Perrier de la Bâthie 1513*, Madagascar, Mokara (holo-, P).
- *F. soroceoides* BAKER var. *mananarensis* H. PERRIER, *l.c.* : 169 (1928), and in HUMBERT, *l.c.* : 68 (1952). Type : *Perrier de la Bâthie 10029*, Madagascar, Mananara River (holo-, P).
- *F. soroceoides* BAKER var. *onivensis* H. PERRIER, *l.c.* : 169 (1928), and in HUMBERT, *l.c.* : 68, tab. 12, fig. 6 (1952). Type : *Perrier de la Bâthie 17027*, near the confluence of the Onive and Mangoro Rivers (holo-, P).
- *F. soroceoides* BAKER var. *calcicola* H. PERRIER in HUMBERT, *l.c.* : 67 (1952), as alternative name for *F. soroceoides* var. *ambongensis*.

TYPE : *Commerson s.n.*, Madagascar, without locality (holo-, P ; iso-, MPU).

Shrub or tree up to 8 m tall. Leafy twigs 0.5-2.5 mm thick, scabrous to smooth, hispidulous to subglabrous, when dry dark to pale brown or greyish, periderm of older parts flaking off. Leaves (almost) distichous, some of them subopposite ; lamina elliptic to oblong, obovate, subobovate, lanceolate, suborbicular, or sublinear, 1.5-10(-16) × 1-4 (-6.5) cm, often slightly unequal-sided, chartaceous to subcoriaceous, apex acuminate (to subacute), base acute to rounded, margin (towards the apex) irregularly crenate-dentate or subentire, sometimes the apex tridentate, in juvenile specimens lamina to pinnately lobed or even parted ; upper surface scabrous, sparsely hispidulous, lower surface hispidulous and scabrous or sometimes on the veins also hirtellous to puberulous ; venation almost plane above, prominent beneath, lateral veins 4-8(-10), the basal pair unbranched or (faintly) branched, not reaching up to the middle of the lamina, tertiary venation reticulate ; glandular spots in the axils of the basal lateral veins, inconspicuous ; petiole 0.3-1 cm long, sometimes up to 3 cm long, ca. 1 mm thick, sparsely hispidulous, epidermis (soon) flaking off ; stipules 0.1-0.4 mm long, (sub)glabrous, caducous.

Figs solitary or in pairs in the leaf axils or on previous season's growth, sometimes (?) also up to 4 together on up to 0.5 mm long spurs on the older wood ; peduncle 0.1-0.8 or sometimes up to 2.5 cm long, ca. 0.5 mm thick, hispidulous ; peduncular bracts 3-4, ovate, ca. 0.5 mm long ; receptacle (sub)globose, when dry ca. 0.5-0.8(-1) cm in diameter, hispidulous, at maturity red, red-brown or yellow to red ; ostiole ca. 2 mm in diameter, plane or prominent.

Staminate flowers sessile or short-pedicellate ; tepals 4 or 5 (or 6), spatulate to oblanceolate to sublinear, 1-1.5 mm long ; filament up to 1 mm long, anther ca. 0.8 mm long. Pistillate flowers : tepals 4-6, subspathulate to oblanceolate to sublinear, (1-) 1.5-2 mm long ; seed flowers sessile or up to 1.5 cm long pedicellate, style (including stigma) ca. 1-1.5 mm long ; gall flowers sessile or up to 1 mm long pedicellate, style (including stigma) ca. 0.4 mm long. Fruits ellipsoid to ovoid, ca. 1 mm long ; "gall fruits" ellipsoid to obovoid, ca. 1 mm long, excl. the 0.1-0.7 mm long stipe.

DISTRIBUTION : Madagascar ; in forest, often along streams ; at altitudes up to 1700 m.

COLLECTIONS EXAMINED. — MADAGASCAR : *Herb. d'Alleizette 302M, 1033M ; Baron 791, 1014, 1074, 1327, 1337, 1554, 1646, 1948, 2246, 2831, 2931, 2933, 2939, 3030, 3178, 3181, 3550, 3580, 3764,*

4060, 4418, 4443, 4504, 5487, s.n. ; Benoist 1134 ; Bernardi 11824, 11957, 12000 ; Bernier 256 ; Blommers 24 ; Boivin 1720, s.n. ; Capuron 97-SF, 111-SF, 608-SF, 653-SF, 18777-SF ; Commerson s.n. ; Cours 332, 768, 2533, 2797 ; Croat 30111 ; Decary 6117, 7107, 10397, 10423, 10455, 10477, 10640, 14359, 18005, 18033, 18106, 18180, 18282 ; Herb. Jard. Bot. Tananarive 2716, 4462, 5003, 5432 ; Homolle s.n. ; Humbert (et al.) 2919, 6260, 24514, 25341, 31386 ; de Lastelle s.n. ; Léandri 1731 ; Lorence 2025 ; Perrier de la Bâthie 1513, 10020, 10029, 10052, 10058, 10059, 10068, 10070, 11842, 11843, 12966, 13118, 14636, 14843, 15675, 15679, 15685, 16732, 17029, 17049, 17697, 17704, 18611 ; Rés. Nat. Madag. 1271, 1505, 2209, 2640, 3910, 4724, 5632, 5883, 7327, 7556, 7666, 8109, 8166, 8207, 8332, 8856, 9195, 9589, 9683 ; Scott Elliot 2211 ; Serv. Forest. Madag. 3722, 3778, 4797, 6015, 6083, 7204, 7807, 25805 ; Viguier & Humbert 913, 1366.

FICUS subg. SYCOMORUS (Gasp.) Mildbr. & Burret

Terrestrial, monoecious trees or shrubs ; sap milky. Leaves in spirals, margin dentate, crenate or (sub)entire, glandular spots in the axils of the (main) lateral veins beneath ; stipules fully amplexicaul. Figs solitary in the leaf axils and/or borne on leafless branchlets on the older wood, often down to the trunk, basal bracts 3, lateral bracts absent ; ostiole circular, with several (in *F. karthalsensis* 3 or 4) ostiolar bracts visible, only the lower ostiolar bracts descending ; interfloral bracts lacking among the pistillate flowers, but the staminate flowers subtended (and often enclosed) by two bract(eole)s ; staminate flowers near the ostiole, perianth saccate ; stamens 2 (or 3) ; seed and gall flowers \pm distinct ; tepals 2-6, mostly basally connate and \pm laciniate ; stigma 1, truncate and \pm infundibuliform to elongate ; endocarp body often released ; wall of the fig in fruit soft, red, orange, or yellowish.

Subg. *Sycomorus* comprises 13 species, one in Asia, five in continental Africa, eight (incl. *F. sycomorus*) in the Madagascar flora region, where five species are confined to Madagascar and one to the Comoro Islands.

5. *Ficus sycomorus* L.

Sp. Pl. : 1059 (1753).

- *Sycomorus antiquorum* GASP., Ricerch Caprific. e Fic. : 96 (1845), as renaming of *F. sycomorus*.
- *Ficus cocculifolia* BAKER, J. Linn. Soc., Bot. 22 : 521 (1887) ; H. PERRIER, Arch. Bot. Bull. Mens. 2 : 144 (1928), and in HUMBERT, Fl. Madagascar, Moracées : 43, tab. 8 (1952). Syntypes : Baron 4660, Madagascar, without locality (K ; iso-, P) ; 4965, *ibid.* (K).
- *F. sakalavarum* BAKER, l.c. : 522 (1887) ; H. PERRIER, l.c. : 144 (1928). Type : Baron 4885, Madagascar, Sakalava "country" (holo-, K ; iso-, P).
- *F. cocculifolia* BAKER var. *sakalavarum* (BAKER) H. PERRIER, l.c. : 146 (1928).
- *F. cocculifolia* BAKER subsp. *sakalavarum* (BAKER) H. PERRIER in HUMBERT, l.c. : 44 (1952).
- *F. comorensis* WARB., Bot. Jahrb. 20 : 152 (1894) ; H. PERRIER in HUMBERT, l.c. : 63 (1952). Type : Hildebrandt 1650, Comoro Islands, Anjouan (holo-, B ; iso-, BM, K, P).

OTHER SYNONYMS : *F. damarensis* Engl., *F. gnaphalocarpa* (Miq.) A. Rich., *F. integrifolia* Sim, *F. scabra* Sim (1909) non Forster f. (1786) nec Willd. (1801), *F. sycomorus* L. subsp. *gnaphalocarpa* (Miq.) C. C. Berg, *F. trachyphylla* (Miq.) Miq., *Sycomorus gnaphalocarpa* Miq., *S. rigida* Miq., *S. trachyphylla* Miq.

Tree up to 15 m tall. Leafy twigs white-puberulous, intermixed with much ($> 10 \times$) longer hairs, when dry brown, periderm flaking off. Leaves in spirals (or tending to distichous); lamina elliptic to oblong to (sub)obovate, ovate or subcordiform, 1.5-14 \times 1-10.5 cm, chartaceous, often brittle when dry, apex rounded to obtuse, base cordate to rounded, margin faintly crenate to subentire; upper surface scabrous, hispidulous, on the midrib puberulous to hirtellous or hirsute, lower surface on the veins puberulous to tomentellous, on the main veins intermixed with much ($> 10 \times$) longer hairs; venation plane above, prominent beneath, lateral veins $2 \times 4-7$, the basal pair branched, reaching the margin below to near the middle of the lamina, tertiary venation partly scalariform; petiole 0.5-3 cm long, 1-3 mm thick, puberulous, intermixed with much ($> 10 \times$) longer hairs, epidermis flaking off; stipules 0.5-1.5 cm long, puberulous or partly subsericeous or subhirsute, caducous.

Figs on up to 20 cm long, branched branchlets on the main branches, sometimes solitary in the leaf axils or just below the leaves but then the figs mostly very large; peduncle 0.3-0.6 cm long, puberulous, epidermis flaking off; basal bracts ovate, 2.5-3 mm long, puberulous; receptacle globose to broadly obovoid to subpyriform, when dry ca. 1.5-2 cm (or up to 5 cm*) in diameter, sparsely puberulous, hirtellous or yellowish-velutinous; wall when dry 1-2 (or 5-7*) mm thick; ostiole 4-6 mm in diameter, prominent, several ostiolar bracts visible.

Staminate flowers sessile; subtending bracts 2-3 mm long; perianth 1.5-2 mm high; anthers 1-1.5 mm long. Pistillate flowers: tepals 4-6, free or basally connate, 1.5-2.5 mm long, \pm lacinate; seed flowers (sub)sessile, style (including stigma) ca. 1.5-2.5 mm long; gall flowers subsessile or up to 2.5 cm (or up to 8 mm*) long pedicellate, style (including stigma) ca. 1-2 mm long. Fruits ellipsoid to ovoid, ca. 1.5 mm long; "gall fruits" ellipsoid to subovoid to oblongoid, 2-2.5 mm (or 3-4 mm*) long, often \pm stipitate.

DISTRIBUTION: Madagascar (West) and Comoro Islands (Anjouan, Moheli, Mayotte); extending to South Africa, Namibia, the Cape Verde Islands, Egypt, Israel, Syria, Arabian Peninsula; near rivers.

COLLECTIONS EXAMINED. — COMORO ISLANDS: *Boivin 3113, s.n.*; *Hildebrandt 1650*; *Humblot (1)164*; *Hutton s.n.*; *Lam & Meeuse 6156*; *Loup 106*; *Tattersall 7, 13*. — MADAGASCAR: *Baron 4660, 4881, 4885, 4965*; *Blommers 14, 21*; *Boiteau 347*; *Boivin 3108*; *Capuron 161-SF, 27838-SF*; *Decary 14731*; *Herb. Jard. Bot. Tananarive 4975, 5025*; *Humbert 5071, 5549, 11311*; *Léandri 982*; *Perrier de la Bâthie 52, 52 bis, 52 ter, 524, 10082, 16485*; *Serv. Forest. Madag. 18*; *Seyrig 5*.

The type collection of *F. sakalavarum* has figs that are slightly larger than normal, namely up to ca. 2.3 cm in diameter. These figs are borne on leafless branchlets (on the older wood). In the collections *Baron 4881*, *Blommers 21*, *Boiteau 347*, *Humbert 5071*, and *Perrier de la Bâthie 16585* (some of whose features are marked with an asterisk in the above description) the figs are much larger than normal and axillary.

It is not quite clear whether a subspecific taxon based on *F. sakalavarum* can be maintained, as the presently available data suggest that a gradual transition from the normal form with relatively small figs to the form with much larger figs occurs. It is also possible that the dimensions of the figs merely depend on the place where the figs are formed on the plant. A study on the fig wasp parasites of the genus *Apocrypta* by ULENBERG (1985) indicates that different species of this genus are associated with the two forms of *F. sycomorus*.

6. *Ficus tiliifolia* Baker

J. Linn. Soc., Bot. 21 : 443 (1885) ; H. PERRIER, Arch. Bot. Bull. Mens. 2 : 147 (1928), and in HUMBERT, Fl. Madagascar, Moracées : 46 (1952).

— *Ficus sphaerophylla* BAKER, *l.c.* : 443 (1885). Type : *Baron 2381*, Madagascar, without locality (holo-, K ; iso-, P).

— *F. tiliifolia* BAKER var. *sphaerophylla* (BAKER) H. PERRIER, *l.c.* : 148 (1928), and in HUMBERT, *l.c.* : 47 (1952).

— *F. trichophlebia* BAKER, *l.c.* : 445 (1885) ; BAILLON in GRANDIDIER, Hist. Madagascar, Bot., Atlas 3 : tab. 296 (1895) ; H. PERRIER, *l.c.* : 148 (1928). Type : *Baron 2417*, Madagascar, without locality (holo-, K ; iso-, P).

— *F. pulvinifera* BAKER, *l.c.* 22 : 522 (1887). Type : *Baron 3406*, Madagascar, without locality (holo-, K).

— *F. tiliifolia* BAKER var. *ambrensis* H. PERRIER, *l.c.* : 148 (1928), and in HUMBERT, *l.c.* : 47 (1952).

TYPE : *Baron 3285*, Madagascar, without locality (holo-, K ; iso-, P).

Tree up to 20 m tall. Leafy twigs 2-6 mm thick, minutely puberulous or on the scars of the stipules white- to yellowish-hirtellous, when dry (red-)brown, periderm flaking off. Leaves in spirals ; lamina cordiform to ovate to elliptic, (3.5-)6.5-16(-35) × (2-)3.5-15 (-26) cm, chartaceous to subcoriaceous, apex short-acuminate to subacute, base subcordate to rounded, margin crenate-dent(icul)ate to coarsely crenate or subentire ; upper surface scabrous to smooth, sparsely hirtellous, lower surface hirtellous to puberulous on the (main) veins or throughout ; venation plane above, prominent beneath, lateral veins 2 × 5-7(-8), the main basal pair branched, reaching the margin near the middle of the lamina, tertiary venation scalariform ; petiole (1-)1.5-9.5(-13) cm long, 1.5-2.5(-3) mm thick, sparsely minutely puberulous, the epidermis flaking off ; stipules 0.5-2.5 cm long, whitish- to yellowish (brown)-subsericeous, hirtellous or subhirsute.

Figs solitary in the leaf axils or just below the leaves, sometimes on up to 10 cm long, branched, leafless branchlets on the older wood down to the trunk ; peduncle 0.3-1 cm long, minutely puberulous ; basal bracts ovate, ca. 2-3 mm long, puberulous ; receptacle subglobose, often ± depressed with a concave upper part, when dry 1.5-2.5 cm in diameter, densely yellowish-puberulous ; wall when dry ca. 1 mm thick ; ostiole ca. 3 mm in diameter, prominent.

Staminate flowers short-pedicellate ; subtending bracts ca. 2.5 mm long ; perianth ca. 1.5 mm high ; anthers ca. 1 mm long, not apiculate. Pistillate flowers : tepals (3-?)⁴ (-5?), connate, 1.5-2 mm long, ± lacinate ; seed flowers sessile, style (including stigma) ca. 1.5 mm long ; gall flowers up to 0.5 mm long pedicellate, style (including stigma) 0.5-1 mm long. Fruits ellipsoid, ca. 1 mm long ; “gall fruits” obovoid to ellipsoid, ca. 1.5 mm long.

DISTRIBUTION : Madagascar (northern and middle part) and Comoro Islands (Anjouan) ; forest, at altitudes up to 1700 m.

COLLECTIONS EXAMINED. — COMORO ISLANDS : *Lavanchie s.n.* — MADAGASCAR : *Herb. d'Alleizette 971 M* ; *Baron 2381, 2417, 3285, 3406, 6083, 6367, 6477, 6712* ; *Blommers 7* ; *Boivin 2027, s.n.* ; *Catalt 1713* ; *Chapelier s.n.* ; *Cours 1032, 1342, 3620* ; *Decary 16970* ; *Forsyth Major 271* ; *Humbert (et al.) 11602 bis, 11603 bis, 14277, 17453, 23409, 23946, 24171, 24481* ; *Jacquemin 83-J* ; *Perrier de la Bâthie*

602, 10023, 10046, 10057, 10073, 10076, 12545, 13933 bis, 13953, 13953 bis, 14066 A, 14066 B, 14066 C, 14066 D, 17559 ; *Serv. Forest. Madag.* 3941, 5713 ; *Seyrig* 6.

7. *Ficus torrentium* H. Perrier

Arch. Bot. Bull. Mens. 2 : 149 (1928), and in HUMBERT, *Fl. Madagascar, Moracées* : 47, *tab.* 8, *fig.* 9 (1952).

LECTOTYPE : *Perrier de la Bâthie* 15092, Madagascar, Ankaizina River (P ; iso-, K).

Tree up to 20 m tall. Leafy twigs 3-5 mm thick, dark brown-hirsute, with minute whitish hairs among the long brown hairs, when dry brown, periderm \pm flaking off. Leaves in spirals ; lamina oblong to elliptic to (sub)obovate, 5-1.8 \times 3-7 cm, subcoriaceous to coriaceous, apex subacute to faintly short-acuminate, obtuse or rounded, base cordate to rounded, margin subentire ; upper surface scabrous to scabridulous, sparsely white-hirsute (to -puberulous), lower surface rather densely white-hirtellous to -pubescent ; venation almost plane above, prominent beneath, lateral veins 2 \times 4(-5), the (main) basal pair (faintly) branched, reaching the margin above the middle of the lamina, tertiary venation scalariform ; petiole 1-3.5 cm long, ca. 2 mm thick, with long brown hairs, intermixed with minute white hairs ; stipules 0.5-1 mm long, white-puberulous to -tomentellous and with long, \pm appressed, brown hairs, caducous.

Figs solitary in the leaf axils ; peduncle 0.3-1 mm long, 1-2 mm thick, densely yellowish-puberulous ; basal bracts ovate, 1.5-2 mm long ; receptacle (depressed-)globose, when fresh 3-4 cm, when dry 1.8-3 cm in diameter, densely yellowish-puberulous and with sparse longer, dark brown hairs, at maturity yellowish ; wall when dry 2-4 mm thick ; ostiole ca. 5 mm in diameter, prominent.

Staminate flowers subsessile or up to 0.5 mm long pedicellate ; subtending bracts ca. 3 mm long ; perianth 2-2.5 mm high ; anthers ca. 1.5 mm long, not apiculate. Pistillate flowers : tepals 2-4, basally connate, 1.5-2.5 mm long, \pm laciniate ; seed flowers sessile, style (including stigma) ca. 1.5-2.5 mm long ; gall flowers subsessile or up to 1 mm long pedicellate, style (including stigma) ca. 1-1.5 mm long. Fruits ovoid to ellipsoid, ca. 1.5 mm long ; "gall fruits" (sub)obovoid, ca. 2 mm long, often slightly stipitate. Pedicels brown hairy.

DISTRIBUTION : Madagascar (Central to North-West) ; along streams ; at altitudes up to 1100 m.

COLLECTIONS EXAMINED. — MADAGASCAR : *Boivin s.n.* ; *Cours* 353, 2246 ; *Decary* 16700 ; *Perrier de la Bâthie* 15092 ; *Serv. Forest. Madag.* 2291.

In the treatments of PERRIER DE LA BÂTHIE this species was mixed up with *F. polyphlebia*.

8. *Ficus polyphlebia* Baker

J. Linn. Soc., Bot. 20 : 262 (1883) ; H. PERRIER, Arch. Bot. Bull. Mens. 2 : 142 (1928), and in HUMBERT, Fl. Madagascar, Moracées : 41 (1952).

— *Ficus albidula* BAKER, l.c. 22 : 523 (1887) ; H. PERRIER, l.c. : 142 (1928).

TYPE : *Baron* 3525, Madagascar, without locality (holo-, K ; iso-, P).

Shrub or tree up to 10(?) m tall. Leafy twigs 2-4 mm thick, white-hirtellous, white-strigillose or sparsely minutely puberulous, when dry brown, periderm persistent, in the upper part of the internodes a few large lenticels. Leaves in spirals ; lamina elliptic to oblong to (sub)obovate, 2-12(-23) × 1-6(-12) cm, subcoriaceous, apex subacute or (faintly) short-acuminate, base cordate to rounded to obtuse, margin entire ; upper surface smooth, sparsely (on the midrib more densely) hirtellous, lower surface sparsely to densely hirtellous (to puberulous) or subglabrous ; venation plane above, ± prominent beneath, lateral veins 2 × (3-)5-8, the basal pair unbranched (to faintly branched), running almost parallel to the margin and reaching it in or below the middle of the lamina, tertiary venation partly scalariform ; petiole 0.3-3(-3.5) cm long, 1-2 mm thick, white-hirtellous, epidermis flaking off ; stipules 0.5-2 cm long, white-strigose to -hirtellous or subglabrous, caducous.

Figs solitary in the axils or on up to 15 cm long, unbranched, leafless branchlets on the older wood, subsessile or up to 0.4 cm long pedunculate ; basal bracts broadly ovate, 2-3 mm long ; receptacle (depressed-)globose, when dry ca. 2-3 cm in diameter, yellowish- or white-puberulous to -hirtellous, at maturity red with white spots ; wall when dry 1.5-2 mm thick ; ostiole ca. 5 mm in diameter, prominent.

Staminate flowers short-pedicellate ; subtending bracts ca. 2 mm long ; perianth ca. 1.5 mm high ; anthers ca. 1 mm long, apiculate. Pistillate flowers : tepals 4 (or 5?), basally connate, 1-1.5 mm long, ± lacinate or with filiform apices ; seed flowers (sub)sessile, style (including stigma) ca. 1.5-2.5 mm long ; gall flowers up to 1.5 mm long pedicellate, style (including stigma) ca. 0.5-1.5 mm long. Fruits ovoid, ca. 1.5 mm long ; "gall fruits" obovoid to ellipsoid, 1.5-2(-4) mm long, often ± stipitate.

DISTRIBUTION : Madagascar (Central) ; in rocky places along streams ("torrents") ; at altitudes up to 1200 m.

COLLECTIONS EXAMINED. — MADAGASCAR : *Baron* 1582, 3525, 3604 ; *Blommers* 15 ; *Bosser* 6458 ; *Cours* 1952, 4391 ; *Decary* 17982 ; *Heim* s.n. ; *Herb. Jard. Bot. Tananarive* 3677 ; *Homolle* 1952 ; *Humbert (et al.)* 3604, 17725, 24216, 25328 ; *Lam & Meeuse* 5891 ; *Léandri* 1585 ; *Perrier de la Bâthie* 10055, 14021, 15173 ; *Rés. Nat. Madag.* 8628, 8831 ; *Serv. Forest. Madag.* 1267, 15284.

9. *Ficus botryoides* Baker

J. Linn. Soc., Bot. 22 : 523 (1887) ; H. PERRIER, Arch. Bot. Bull. Mens. 2 : 142 (1928).

— *Ficus stenoclada* BAKER, l.c. 25 : 346 (1890) ; H. PERRIER, l.c. : 142 (1928). Type : *Baron* 5882, Madagascar, without locality (holo-, K).

— *F. oxystipula* BAKER, l.c. 25 : 345 (1890) ; H. PERRIER, l.c. : 142 (1928). Type : *Baron* 5331, Madagascar, without locality (holo-, K ; iso-, P).

TYPE : *Baron* 3803, Madagascar, without locality (holo-, K ; iso-, P).

Tree up to 22 m tall. Leafy twigs 2-2.5 mm thick, minutely appressed-puberulous (or glabrous), when dry brown, periderm \pm flaking off. Leaves in spirals; lamina lanceolate to oblong or sublinear, (3-)7-18(-24) \times (0.5-)1.5-6(-9) cm, (sub)coriaceous, apex acuminate to acute, base acute to obtuse (to rounded), margin (sub)entire; upper surface glabrous, lower surface glabrous or very sparsely appressed-puberulous on the main veins; venation plane above, beneath the midrib prominent, the other veins plane to slightly prominent. Lateral veins 2 \times (5-)7-10(-15), the basal pairs unbranched (or faintly branched), reaching the margin below the middle of the lamina, tertiary venation reticulate; petiole (0.7-)1-3 (-5) cm long, 1-1.5 mm thick, minutely appressed-puberulous (or glabrous), epidermis flaking off; stipules (0.7-)1-3 cm long, glabrous, ciliolate, or very sparsely appressed-puberulous, caducous.

Figs on up to 5 cm long, branched branchlets (or in pairs or solitary on up to 30 cm long unbranched branchlets with long internodes and terminally with small leaves) from the base of the trunk up to the main branches; peduncle (0.7-)1-8 cm long, ca. 1.5 mm thick, minutely appressed-puberulous, epidermis flaking off; basal bracts ovate, ca. 4 mm long, minutely appressed-puberulous, inside glabrous and conspicuously veined; receptacle broadly ovoid to depressed-globose, when dry 1.2-2.5 cm in diameter, minutely appressed-puberulous, at maturity red(-brown); wall when dry 1-2 mm thick; ostiole ca. 4 mm in diameter, prominent, many ostiolar bracts visible.

Staminate flowers sessile; subtending bracts ca. 2 mm long; perianth ca. 1.5 mm high; anthers ca. 1 mm long, not apiculate. Pistillate flowers: tepals 4, basally connate, ca. 1.5-2 mm long, with filiform apices; seed flowers sessile, style (including stigma) ca. 1.5 mm long; gall flowers up to 1 mm long pedicellate, style (including stigma) ca. 0.5-1 mm long. Fruits ovoid to subglobose, ca. 1.2 mm long; "gall fruits" obovoid to ellipsoid, ca. 1.5-2.2 mm long.

DISTRIBUTION : Madagascar; forest; up to 1600 m alt.

COLLECTIONS EXAMINED. — MADAGASCAR : *Baron* 3803, 5331, 5882; *Blommers* 13, 28; *Boivin* 2026 (in P mixed with *F. reflexa* subsp. *reflexa*); *Humbert* 2330, 5785; *Jacquemin* H.520-J; *Perrier de la Bâthie* 489, 489 bis, 9946, 10033, 10053, 10066, 15166, 15429, 16984; *Rés. Nat. Madag.* 1080; *Serv. Forest. Madag.* 68-B.

10. *Ficus trichoclada* Baker

J. Linn. Soc., Bot. 22 : 524 (1887); H. PERRIER, Arch. Bot. Bull. Mens. 2 : 142 (1928).

— *Ficus laurus* BAILLON in GRANDIDIER, Hist. Madagascar, Bot., Atlas 3 : tab. 301 (1895). Type : Hist. Madagascar, Bot., Atlas 3 : tab. 301 (1895), probably based on *Grevé* 58, Madagascar, without locality (B, BM, P).

TYPE : *Baron* 3547, Madagascar, without locality (holo-, K; iso-, P).

Shrub or tree up to 15 m tall. Leafy twigs 1-4 mm thick, white-puberulous to tomentose, when dry brown, periderm flaking off. Leaves in spirals; lamina lanceolate to oblong (to subovate), (1.5-)5-15(-20) \times (1-)1.5-5.5(-6.5) cm, coriaceous, apex subacute to obtuse, base acute to obtuse (or rounded), margin entire; upper surface smooth, sparsely

puberulous on the lower part of the midrib, lower surface puberulous (or on the midrib to hirtellous) or subglabrous; venation plane above, only the midrib \pm prominent beneath, lateral veins $2 \times (5-8-13)$, basal pair \pm distinct, unbranched, reaching the margin (far) below the middle of the lamina, tertiary venation reticulate; petiole (0.5-)0.7-2(-2.5) cm long, 1-1.5 mm thick, puberulous to subtomentose, epidermis flaking off; stipules 0.5-1.2 (-2) cm long, (sometimes sparsely) subsericeous to appressed-puberulous (or pubescent), caducous.

Figs solitary in the leaf axils, or just below the leaves, or (sometimes?) on up to ca. 15 cm long, unbranched or branched branchlets on the older wood, down to the trunk; peduncle 0.4-0.8 cm long, 2-2.5 mm thick, puberulous, epidermis flaking off; basal bracts ovate, 1.2-2 mm long, appressed-puberulous; receptacle depressed-globose to subpyriform, when dry 1.5-2.5 cm in diameter, sometimes \pm stipitate, puberulous to subtomentose; wall when dry 2-4 mm thick; ostiole 4-5 mm in diameter, prominent.

Staminate flowers short-pedicellate; subtending bracts ca. 2 mm long; perianth ca. 1.5 mm high; anthers ca. 1 mm long, not apiculate. Pistillate flowers: tepals (3 or 4, basally connate, ca. 1.5 mm long, \pm laciniate; seed flowers sessile, style (including stigma) ca. 2 mm long; gall flowers up to 2 mm long pedicellate, style (including stigma) ca. 1-1.5 mm long. Fruits ovoid to subglobose, ca. 1.5 mm long; "gall fruits" ellipsoid to obovoid to pyriform, 1.5-2 mm long, often \pm stipitate.

DISTRIBUTION: Madagascar (southern part, West to Central); along streams; at altitudes up to 1500 m.

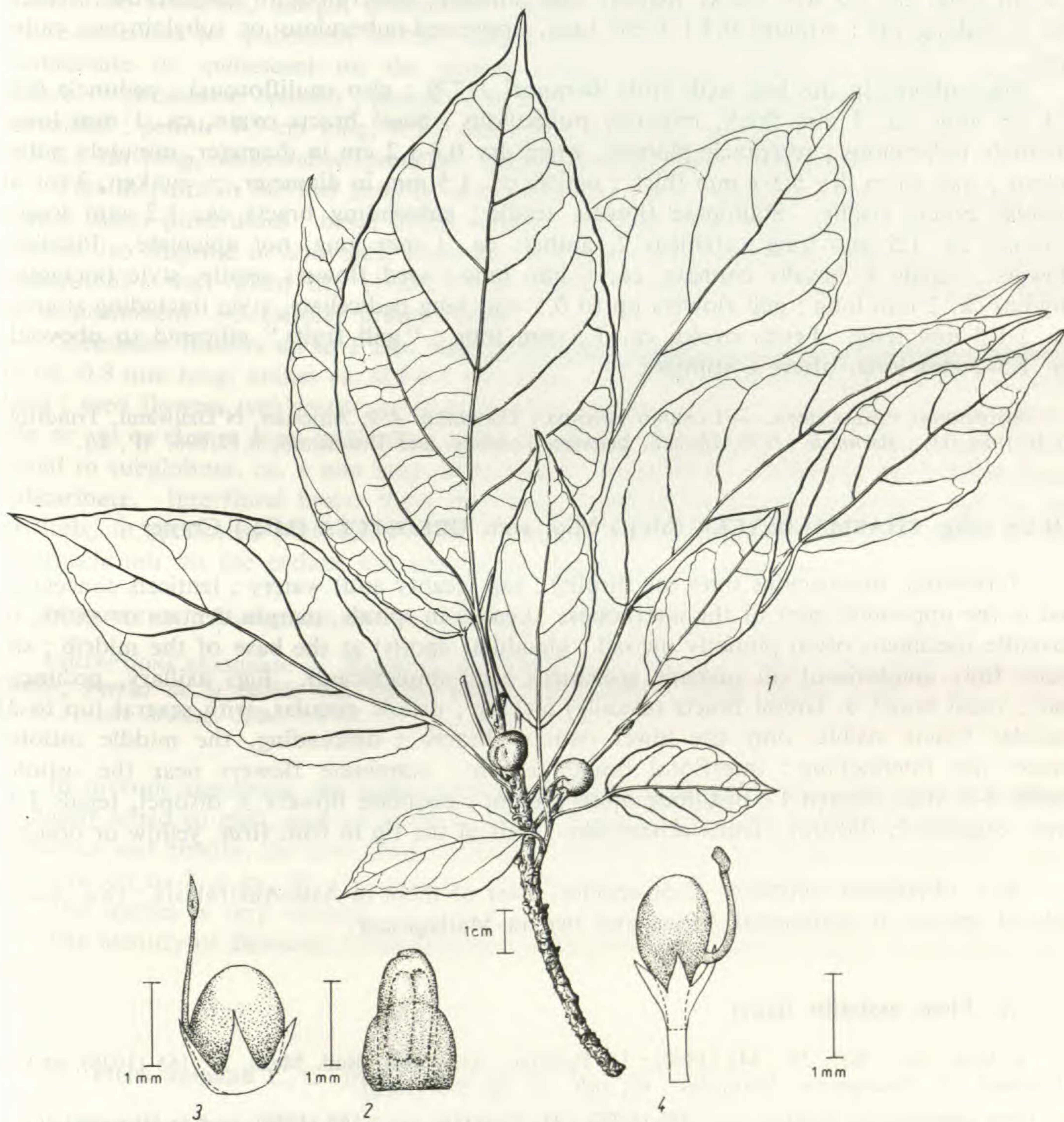
COLLECTIONS EXAMINED. — MADAGASCAR: *Baron* 3547, 6993 (in K mixed with *F. botryoides*); *Bosser* 9168, 9963, 13406; *Cremers* 3544; *Croat* 30184; *Decary* 13807, 16343; *Grevé* 58; *Humbert* 2982, 3054, 3942, 5269, 6060, 6243, 6475, 6676, 11607, 12280, 13005; *Keraudren* 285; *Perrier de la Bâthie* 10027, 10028, 10075, 10085, 12381, 13117, 13948, 16645; *Serv. Forest. Madag.* 3674, 4477, 13535; *Sylvain* 1, 28.

11. *Ficus karthalensis* C. C. Berg, *sp. nov.* — Pl. 1.

Arbor. Ramuli foliosi sparse et minute puberuli vel glabri. Lamina (sub)ovata vel elliptica vel oblonga, (1.5-)4-15 \times (1-)2-9 cm, apice acuminata vel acuta, basi rotundata vel emarginata, facie inferiore sparse et minute puberula vel glabra; venae laterales pro latere (2-)4-6; petiolus (0.5-)1-3 cm longus; stipulae 0.5-1.3 cm longae. Syconia axillaria; pedunculus 0.3-0.4 cm longus; bractae basales ca. 1 mm longae; receptaculum statu sicco 0.8-1.2 cm diam., minute puberulum; bractae ostiolares evidentes 3 (vel 4).

TYPE: *Bernardi* 11703, Comoro Islands, Grande Comore, Karthale Mt., 4.12.1967 (holo-, P; iso-, K, L).

Tree up to 20 m tall. Leafy twigs 2-3 mm thick, sparsely and minutely puberulous to glabrous, when dry brown, periderm of the older parts \pm flaking off. Leaves in spirals; lamina (sub)ovate to elliptic to oblong, (1.5-)4-15 \times (1-)2-9 cm, chartaceous to subcoriaceous, apex acuminate to acute, base (acute) to rounded to emarginate, margin entire; upper surface smooth and glabrous, lower surface sparsely and minutely puberulous on the main veins or glabrous; venation (almost) plane above, beneath main veins \pm prominent,



Pl. 1. — *Ficus karthalensis* C. C. Berg : 1, leafy twig with figs ; 2, staminate flower ; 3, seed flower ; 4, gall flower. (*Bernardi 11703*).

lateral veins $2 \times (2-)$ 4-6, (main) basal pair, faintly branched, reaching the margin near the middle of the lamina, tertiary venation for the greater part scalariform; petiole (0.5-) 1-3 cm long, ca. 1-2 mm thick, sparsely and minutely puberulous to subglabrous, epidermis \pm flaking off; stipules 0.5-1.3 cm long, appressed-puberulous or subglabrous, caducous.

Figs solitary in the leaf axils (fide *Bernardi 11779*: also cauliflorous); peduncle 0.3-0.4 cm long, ca. 1 mm thick, minutely puberulous; basal bracts ovate, ca. 1 mm long, minutely puberulous; receptacle globose, when dry 0.8-1.2 cm in diameter, minutely puberulous; wall when dry 0.5-1 mm thick; ostiole ca. 1.5 mm in diameter, \pm sunken, 3 (or 4) ostiolar bracts visible. Staminate flowers sessile; subtending bracts ca. 1.2 mm long; perianth ca. 1.5 mm long; stamens 2, anthers ca. 1 mm long, not apiculate. Pistillate flowers: tepals 4, basally connate, ca. 1 mm long; seed flowers sessile, style (including stigma) ca. 2 mm long; gall flowers up to 0.5 mm long pedicellate, style (including stigma) ca. 1-1.5 mm long. Fruits ovoid, ca. 1.5 mm long; "gall fruits" ellipsoid to obovoid, ca. 1.5-2 mm long, often \pm stipitate.

ADDITIONAL COLLECTIONS. — COMORO ISLANDS: *Ducatillon 459*, Anjouan, N'Dzuwami, Trindrini, 31.10.1984 (U); *Bernardi 11779*, Moheli, between Fombosi and Drandroni, 6.12.1967 (P, L).

FICUS subg. PHARMACOSYCEA (Miq.) Miq. sect. OREOSYCEA (Miq.) Corner

Terrestrial, monoecious trees (or shrubs); sap (scanty and) watery; lenticels concentrated in the uppermost part of the internodes. Leaves in spirals, margin dentate or entire, in juvenile specimens often pinnately incised; glandular spot(s) at the base of the midrib; stipules fully amplexicaul (in juvenile specimens semi-amplexicaul). Figs axillary, pedunculate; basal bracts 3, lateral bracts (usually) lacking; ostiole circular, with several (up to 3) ostiolar bracts visible, only the lower ostiolar bracts \pm descending, the middle ostiolar bracts not interlocking; interfloral bracts present; staminate flowers near the ostiole, tepals 3-5, free, stamen 1; pistillode often present; pistillate flowers \pm distinct, tepals 3-5, free; stigmas 2, filiform; fruits achene-like; wall of the fig in fruit firm, yellow or orange.

Sect. *Oreosycea* comprises 45-50 species, most of them in Asia-Australasia; two closely related species in continental Africa and two in Madagascar.

12. *Ficus assimilis* Baker

J. Linn. Soc., Bot. 25: 345 (1890); H. PERRIER, Arch. Bot. Bull. Mens. 2: 165 (1928), and in HUMBERT, Fl. Madagascar, Moracées: 63, tab. 10, fig. 3-5 (1952).

— *Ficus guatteriifolia* BAKER, l.c.: 346 (1890); H. PERRIER, l.c.: 163 (1928), and in HUMBERT, l.c.: 63, tab. 11, fig. 4-7 (1952). Type: *Baron 5812*, Madagascar, without locality (holo-, K).

TYPE: *Baron 5821*, Madagascar, without locality (holo-, K; iso-, P).

Tree up to 25 m tall. Leafy twigs 1.5-3(-6) mm thick, glabrous, minutely puberulous or sparsely to densely white-hirtellous to -pubescent, when dry often blackish or dark

brown. Leaves in spirals ; lamina subovate to oblong, ovate to elliptic or lanceolate, 5.5-17 × 2.5-6 cm, (sub)coriaceous, apex (faintly) acuminate to acute, base rounded to subcordate or to subacute, margin (sub)entire ; upper surface smooth to scabrous, glabrous or white-hirtellous to -pubescent on the midrib, lower surface glabrous or white-hirtellous to -subhirsute to -pubescent on the (main) veins ; venation plane to slightly prominent above, ± prominent beneath ; lateral veins 2 × 7-14, tertiary venation partly scalariform or reticulate ; petiole 1-5 cm long, 0.5-2 mm thick, glabrous, hirtellous or pubescent ; stipules 0.3-1.5 cm long, white-subsericeous or -appressed-puberulous, caducous.

Figs in pairs in the leaf axils or just below the leaves ; peduncle 0.3-1.3 cm long, 0.5-1 mm thick, puberulous ; basal bracts ovate, 1-1.5 mm long, puberulous ; receptacle (sub)globose (to ellipsoid or obovoid), when dry (0.5-)1-1.5 cm in diameter, glabrous or minutely puberulous ; wall when dry (1-)2-2.5 mm thick ; ostiole 1-2.5 mm in diameter, plane or ± prominent, 3-5 ostiolar bracts visible.

Staminate flowers up to 1 mm long pedicellate ; tepals 3-7, 0.7-1.2 mm long ; filament to ca. 0.8 mm long, anther ca. 0.5-0.7 mm long. Pistillate flowers : tepals 3-8, ca. 1-2 mm long ; seed flowers (sub)sessile, style (including stigmas) 1-3 mm long ; gall flowers subsessile or up to 2 mm long pedicellate, style (including stigmas) ca. 0.5-1 mm long. Fruits ovoid to subglobose, ca. 1 mm long, subcarinate ; "gall fruits" ellipsoid, ca. 1.2 mm long, subcarinate. Interfloral bracts 0.6-1 mm long ; these bracts on the receptacle and on the pedicels, in specimens with more than 3-5 tepals the interfloral bracts not found on the receptacle nor on the pedicel but apparently moved in and included in the perianth.

DISTRIBUTION : Madagascar (West) ; in forest ; at altitudes up to 1000 m.

COLLECTIONS EXAMINED. — MADAGASCAR : *Baron 5821 ; Bernardi 11929 ; Boivin 2027 ; Humbert 19497 ; Perrier de la Bâthie 692, 10025, 10036, 10038, 10043, 10044, 10061, 14840, 15427, 15681 ; Serv. Forest. Madag. 5881, 13318.*

In juvenile specimens the leafy twigs are reddish-brown when dry ; the lamina is often pinnately lobed to cleft, and up to 25 × 8.5 cm ; upper and lower surface scabrous to scabridulous and hirsute, the apex long-acuminate, the base acute to obtuse (to rounded) ; lateral veins up to 2 × ca. 20, the tertiary venation more pronouncedly scalariform.

The species is very variable.

The identity of *Bernardi 11929* (the only collection from Nossi-Komba) is not quite certain.

13. *Ficus ampana* C. C. Berg, *sp. nov.* — Pl. 2.

Arbor parva. Ramuli foliosi glabri. Lamina elliptica vel oblonga vel lanceolata, 3-7 × 1-4 cm, apice obtusa vel rotundata vel breviter acuminata, basi obtusa ; venae laterales pro latere 6-8, nervatura tertiaria reticulata ; petiolus 0.5-1.2 cm longus ; stipulae 0.3-0.5 cm longae. Syconia axillaria ; pedunculus 0.3-0.6 cm longus ; bractae basales ca. 1 mm longae ; receptaculum statu sicco ca. 0.8 cm diam.

TYPE : *Service Forestier de Madagascar 14550, Madagascar, Androrangavola, Hanadrana, 24.7.1954 (holo-, P).*

Shrub or treelet. Leafy twigs 1.5-2.5 mm thick, glabrous, when dry blackish. Leaves in spirals; lamina oblong to elliptic or to lanceolate, 3-7 × 1-4 cm, coriaceous, apex obtuse to rounded or very shortly and obtusely acuminate, base obtuse (to rounded), margin entire; both surfaces glabrous; venation nearly plane above, beneath the midrib prominent, the other veins (almost) plane; lateral veins 2 × 6-8, tertiary venation reticulate; petiole 0.5-1.2 cm long, ca. 1 mm thick, glabrous; stipules 0.3-0.5 cm long, glabrous or sparsely appressed-puberulous, caducous.

Figs solitary (or in pairs) in the leaf axils; peduncle 0.3-0.6 cm long, 0.5-1 mm thick, minutely puberulous; basal bracts ovate, ca. 1 mm long, glabrous; receptacle globose, when dry ca. 0.8 cm in diameter, glabrous; ostiole ca. 1.5 mm in diameter, slightly prominent, 3 (or 4) ostiolar bracts visible.

Staminate flowers up to ca. 1 mm long pedicellate; tepals 4, free, ca. 0.7-1.2 mm long; anther ca. 0.5 mm long. Pistillate flowers: tepals 4 or 5, free, 1-1.8 mm long; seed flowers sessile, style (including stigmas) ca. 1.5-3 mm long; gall flowers subsessile or up to 2 mm long pedicellate; style (including stigmas) ca. 0.8-1.5 mm long. Fruits ovoid to ellipsoid to subglobose, ca. 1 mm long; "gall fruits" ellipsoid to obovoid, ca. 1 mm long. Interfloral bracts few, 1.5-2 mm long, sometimes on the pedicel of the gall flower (or sometimes lacking?).

ADDITIONAL COLLECTION: *Serv. Forest. Madag.* 2659, Madagascar, Sandrangato, Moramanga, 10.1.1951 (P).

Named after the vernacular name "ampana".

FICUS subg. UROSTIGMA (Gasp.) Miq. sect. UROSTIGMA

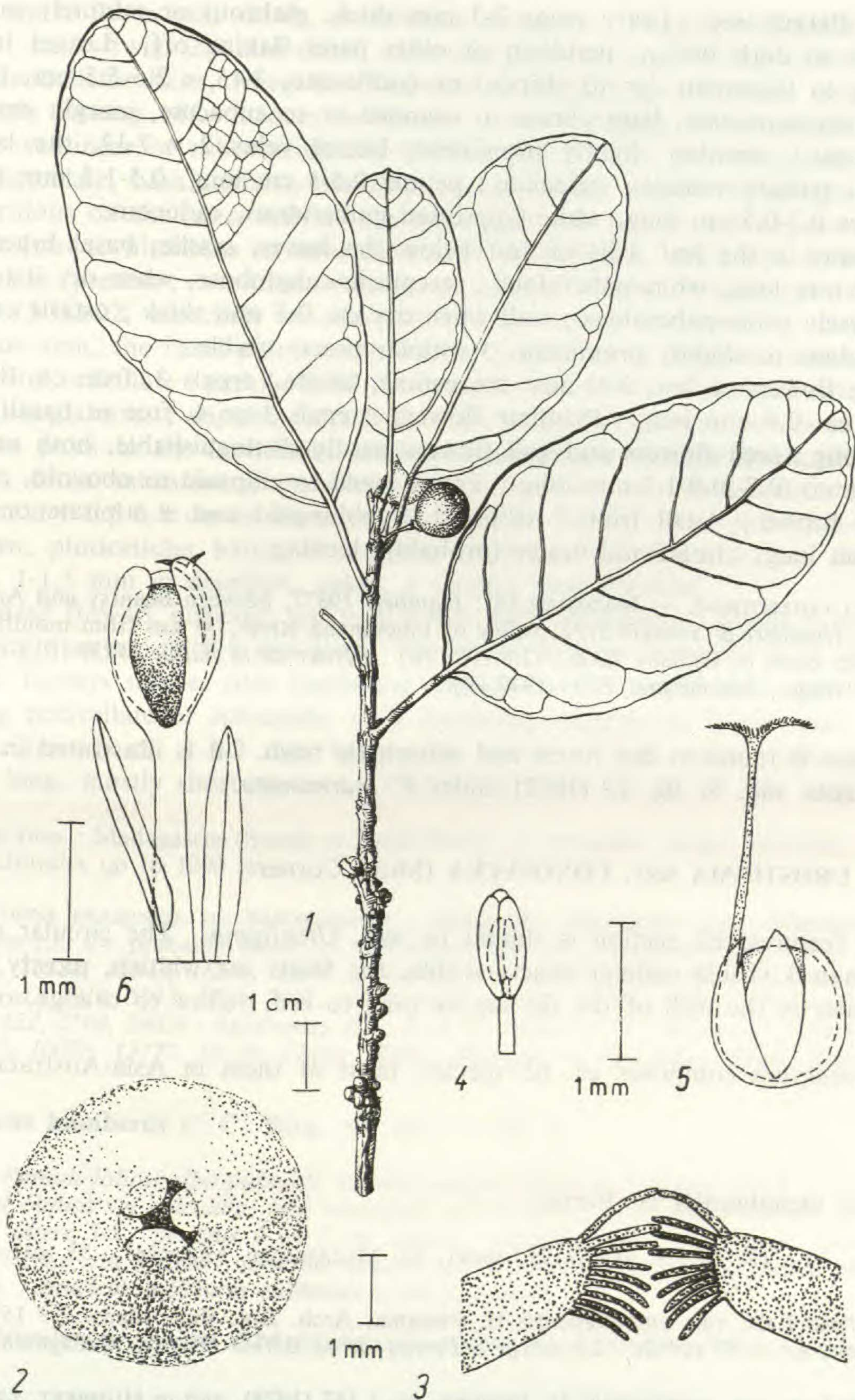
Terrestrial (or hemi-epiphytic), monoecious trees or shrubs; sap milky. Leaves in spirals, margin entire; stipules fully amplexicaul. Figs axillary or just below the leaves, sessile or pedunculate; basal bracts 3, lateral bracts lacking; ostiole circular with 3 ostiolar bracts visible, only the lower ostiolar bracts descending, the middle ones interlocking; interfloral bracts present or lacking; staminate flowers near the ostiole or disperse, tepals 3 or 4; stamen 1; seed and gall flowers often slightly distinct; tepals 3 or 4, stigma 1. Fruit achene-like, entirely brown; wall of the fig in fruit soft, at maturity pink, red or purple.

Sect. *Urostigma* comprises 20 species; in Asia-Australasia 15 species, three species in continental Africa, one species each in Madagascar and the Mascarene Islands.

14. *Ficus madagascariensis* C. C. Berg, *sp. nov.*

Arbor. Ramuli foliosi glabri vel minute puberuli. Lamina oblonga vel lanceolata vel subovata, 7-15 × 2.5-5.5 cm, apice longe acuminata, basi obtusa vel rotundata vel subacuta, facie utriusque glabra; venae laterales pro latere 7-12; petiolus 0.5-5 cm longus; stipulae 0.3-0.5 cm longae. Syconia axillaria sessile; bractae basales ca. 1.5 mm longae; receptaculum statu sicco 0.3-0.6 cm diam.

TYPE: *Perrier de la Bâthie* 10045, Madagascar, Menamaty, Oct. 1911 (holo-, P).



Pl. 2. — *Ficus ampana* C. C. Berg : 1, leafy twig with figs ; 2, ostiole ; 3, ostiolar bracts ; 4, staminate flower ; 5, seed flower ; 6, gall flower with interfloral bracts. (Serv. Forest. Madag. 14550).

Shrub or (large) tree. Leafy twigs 2-3 mm thick, glabrous or minutely puberulous, when dry pale to dark brown, periderm of older parts flaking off. Leaves in spirals; lamina oblong to lanceolate (or to elliptic) or (sub)ovate, 7-15 × 2.5-5.5 cm, (sub)coriaceous, apex long-acuminate, base obtuse to rounded or to subacute, margin entire; both surfaces glabrous; venation slightly prominent, lateral veins 2 × 7-12, the basal pairs rather distinct, tertiary venation reticulate; petiole 0.5-5 cm long, 0.5-1.5 mm thick, glabrous; stipules 0.3-0.5 cm long, white-(appressed-)puberulous, caducous.

Figs in pairs in the leaf axils or just below the leaves, sessile; basal bracts broadly ovate, ca. 1.5 mm long, white-puberulous; receptacle subglobose, when dry 0.4-0.6 cm in diameter, sparsely white-puberulous; wall when dry ca. 0.5 mm thick; ostiole ca. 1.5 mm in diameter, plane to slightly prominent, 3 ostiolar bracts visible.

Staminate flowers (a few, 2-4) near the ostiole, sessile; tepals 3, free, ca. 0.6-0.8 mm long; anther ca. 0.4 mm long. Pistillate flowers: tepals 3 or 4, free or basally connate, 0.5-0.8 mm long; seed flowers and gall flowers hardly distinguishable, both sessile, style (including stigma) (0.7-)0.9-1.2 mm long. Fruits ovoid to ellipsoid to obovoid, ca. 0.8 mm long, entirely brown; "gall fruits" ellipsoid to oblongoid and ± stipitate or subovoid, ca. 1.2-1.5 mm long. Interfloral bracts (probably) lacking.

ADDITIONAL COLLECTIONS. — MADAGASCAR: *Humbert 19877*, between Beantsy and Anjamala, 16-19.1.1947 (P); *Humbert & Swingle 5112*, valley of Fiheranana River, 35 km from mouth, 2-3.8.1928 (K); *5229*, lower basin of Onilahy River, 12.8.1928 (K); *Perrier de la Bâthie 19239* (P); *Serv. Forest. Madag. 2419*, Ivongo, Soanierana, 27.11.1949 (P).

The species is found in dry forest and xerophytic bush. It is illustrated in *Fl. Madagascar, Moracées, tab. 9, fig. 12* (1952) under *F. marmorata*.

FICUS subg. UROSTIGMA sect. CONOSYCEA (Miq.) Corner

In most features this section is similar to sect. *Urostigma*. The circular ostiole may have more than 3 visible ostiolar bracts visible, the fruits are whitish, mostly with a red mark; at maturity the wall of the fig can be pink to red, yellow to orange, or greenish.

Sect. *Conosycea* comprises ca. 65 species, most of them in Asia-Australasia, two in Madagascar.

15. *Ficus menabeensis* H. Perrier

Not. Syst. 14 : 167 (1952), and in HUMBERT, *Fl. Madagascar, Moracées* : 53, *tab. 10, fig. 1, 2* (1952).

— *Ficus pyrifolia* LAM. var. *ambongoensis* H. PERRIER, *Arch. Bot. Bull. Mens.* 2 : 157 (1928), and in HUMBERT, *l.c.* : 57 (1952). Lectotype : *Perrier de la Bâthie 660 bis*, Madagascar, Firingalava (P).

— *F. pyrifolia* LAM. var. *meridionalis* H. PERRIER, *l.c.* : 157 (1928), and in HUMBERT, *l.c.* : 57 (1952). Lectotype : *Perrier de la Bâthie 10047*, Madagascar, Makay River (P).

LECTOTYPE : *Herb. Jard. Bot. Tananarive 6167*, Madagascar, E of Bemaraha, 2.8.1943 (P).

Tree up to 20 m tall, shrub, or epilithic scrambler, (often?) with aerial roots on the branches. Leafy twigs 2-5 mm thick, white-puberulous (or glabrous), often also with dark brown, pluricellular hairs, when dry brownish to greyish (or purplish), periderm of older parts mostly flaking off. Leaves in spirals; lamina oblong to lanceolate or to elliptic, sometimes sublinear or suborbicular, (1-)3-20 × (0.5-)1.5-5.5 cm, coriaceous, apex obtuse, acute or apiculate, base acute to rounded, margin entire; upper surface glabrous or sparsely puberulous on the lower half of the lamina or only on the midrib, lower surface densely puberulous to hirtellous to tomentellous to subglabrous, often also dark brown, pluricellular hairs present; venation slightly prominent above, prominent beneath, lateral veins 2 × (3-)12-22, especially in relatively narrow leaves connected by a slightly arcuate submarginal vein, the basal pair mostly distinct (especially in relatively narrow leaves), tertiary venation reticulate; petiole 0.3-2 cm long, 1-2 mm thick, white-puberulous to tomentellous to subglabrous; stipules 0.5-1.5(-2.5) cm long, puberulous, caducous.

Figs in pairs in the leaf axils, sessile; basal bracts broadly ovate, 2.5-3 mm long, coriaceous, often subcarinate, puberulous, tomentellous, or subglabrous; receptacle globose, when dry 0.5-0.8 cm in diameter, sparsely to densely white-puberulous and/or with dark brown, pluricellular hairs, at maturity reddish; wall when dry ca. 0.5 mm thick; ostiole ca. 1-1.5 mm in diameter, plane, 3 ostiolar bracts visible.

Staminate flowers disperse, up to 0.5 mm long pedicellate; tepals 3 or 4, free, 0.6-0.8 mm long; anther ca. 0.4 mm long. Staminate flowers: tepals 3 or 4, free, 0.8-1 mm long; seed flowers sessile, style (including stigma) ca. 0.7-1 mm long; gall flowers up to 1 mm long pedicellate or subsessile, style (including stigma) ca. 0.5-0.7 mm long. Fruits ovoid to ellipsoid, ca. 1-1.2 mm long, pale yellow; "gall fruits" ellipsoid to ovoid, ca. 1 mm long, mostly short-stipitate. Interfloral bracts up to 1.2 mm long.

DISTRIBUTION: Madagascar (South to South-West); in savannas, dunes, riversides, often in rocky places; at altitudes up to 1200 m.

COLLECTIONS EXAMINED. — MADAGASCAR: *Basse* 28; *Blackburn* s.n.; *Blommers* 23; *Bosser* 7789; *Bouton* s.n. (= probably *Bojer* s.n.); *Chauvet* 101, 195; *Cremers* 3598; *Croat* 29749; *Decary* 9877, 10652, 15126, 15915, 16285, 16305; *Douillot* s.n.; *Herb. Jard. Bot. Tananarive* 6151, 6167; *Humbert (et al.)* 2910, 5012, 5123, 7093, 11203, 11355, 11586, 12734, 13045, 13240, 19558; *Keraudren (et al.)* 215, 622, 2508, 24638; *Mabberley* 995; *J. & M. Peltier* 5513; *Perrier de la Bâthie* 660, 660 bis, 10047, 10077, 10078, 12777, 13129, 17858, 19306; *Richard* 11, 42; *Serv. Forest. Madag.* 29, 13813.

16. *Ficus humbertii* C. C. Berg, *sp. nov.* — Pl. 3.

Frutex. Ramuli foliosi albo-puberuli. Lamina suborbiculata vel elliptica, 0.5-2 × 0.5-1.5 cm, apice rotundata vel obtusa vel apiculata, basi rotundata vel truncata, facie utriusque minute puberula; venae laterales pro latere 3-5; petiolus 0.1-0.5 cm longus; stipulae 0.2-0.5 cm longae. Syconia axillaria; pedunculus 0.1-0.2 cm longus; bractae basales ca. 1 mm longae; receptaculum statu sicco 0.4-0.7 cm diam.; bractae ostiolaris evidentes 4 vel 5, parvae.

TYPE: *Humbert & Swingle* 5325, Madagascar, near Lake Tsimanampetsotsa, 16-20.8.1928 (holo-, P; iso-, B).

Shrub up to 2 m tall. Leafy twigs 1.5-2 mm thick, white-puberulous, when dry greyish to dark (red-)brown to blackish, periderm persistent or slightly flaking off. Leaves

in spirals ; lamina suborbicular to elliptic, 0.5-2 × 0.5-1.5 cm, coriaceous, apex rounded, obtuse, or apiculate, base rounded to truncate, margin entire ; upper surface sparsely puberulous in the lower half of the lamina, lower surface (sparsely) minutely puberulous ; venation plane above, only the midrib slightly prominent beneath, lateral veins 2 × 3-5, the basal pair slightly distinct, the middle ones often furcate far from the margin, tertiary venation reticulate ; petiole 0.1-0.5 cm long, 0.5-1 mm thick, puberulous ; stipules 0.2-0.5 cm long, puberulous, caducous.

Figs in pairs (or solitary) in the leaf axils ; peduncle 0.1-0.2 cm long, 0.5 mm thick, minutely puberulous ; basal bracts ovate, ca. 1 mm long, puberulous ; receptacle globose, when dry 0.4-0.7 cm in diameter, minutely puberulous ; wall when dry ca. 1 mm thick ; ostiole ca. 1 mm in diameter, slightly prominent to plane, 4 or 5 ostiolar bracts visible, these bracts small and the lower part thickened.

Staminate flowers near the ostiole, sessile ; tepals 3, free, ca. 1 mm long ; anther ca. 0.5 mm long. Pistillate flowers : tepals 4, free, 1-1.2 mm long ; seed flowers sessile, style (including stigma) ca. 1.5 mm long ; gall flowers up to 0.5 mm long pedicellate, style (including stigma) 0.8-1.2 mm long. Fruits ovoid, ca. 1.2 mm long, pale yellow with a dark spot below the base of the style ; "gall fruits" ellipsoid to obovoid, ca. 1.2-1.5 mm long. Interfloral bracts ca. 1-1.5 mm long.

ADDITIONAL COLLECTIONS. — MADAGASCAR, near Lake Tsimanampetsotsa : *Capuron 18659-SF*, 2.7.1958 (P) ; *Humbert 20239*, 14.2.1947 (P) ; *Léandri 4053*, 25.11.1960 (P).

FICUS subg. UROSTIGMA sect. GALOGLYCHIA (Gasp.) Endl.

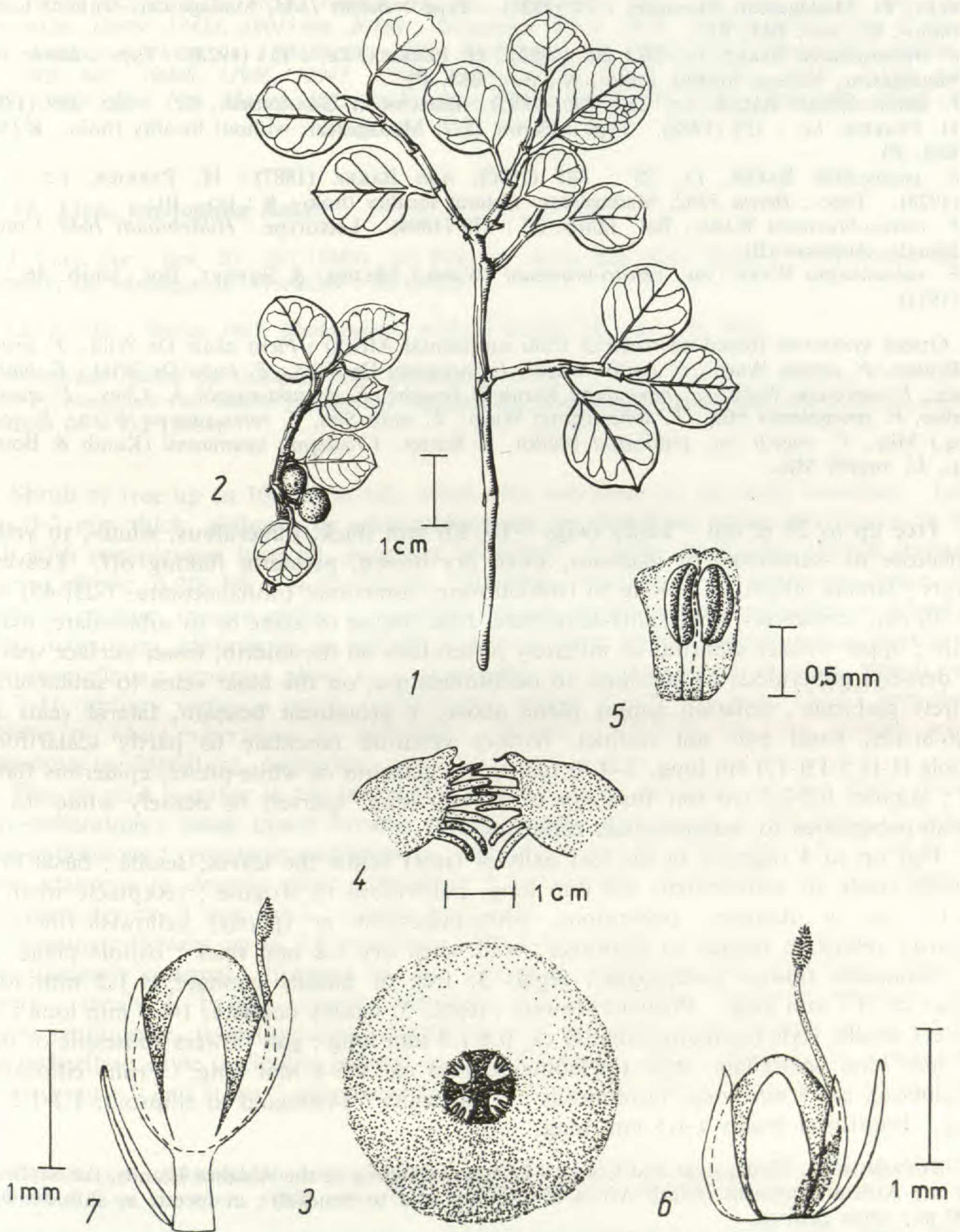
Terrestrial or hemi-epiphytic, monoecious trees or shrubs ; sap milky. Leaves in spirals (or tending to distichous), margin entire ; stipules fully amplexicaul. Figs axillary, just below the leaves or on spurs on the older wood, pedunculate or sessile ; basal bracts 2, lateral bracts lacking, ostiole slit-shaped, all ostiolar bracts descending ; staminate flower disperse, tepals 2 or 3 (or 4), free or basally connate ; stamen 1 ; pistillode usually absent ; seed and gall flowers ± distinct, tepals 2 or 3 (or 4), free or basally connate, stigma 1 (or 2) ; fruit achene-like or ± drupaceous, endocarp body released or not ; wall of the fig in fruit soft or firm, green, yellow, or purplish.

Sect. *Galoglychia* comprises 72 species, all in the African flora region ; nine of them are found in Madagascar and the Comoro Islands.

17. *Ficus lutea* Vahl

Enum. 2 : 185 (1805).

- *Urostigma luteum* (VAHL) MIQ., London J. Bot. 6 : 554 (1847).
- *Ficus nautarum* BAKER, Fl. Mauritius and Seychelles : 285 (1877) ; FOSBERG & RENVOIZE, Kew Bull., Additional Ser., 7 : 272, tab. 44, fig. 2 (1980). Syntypes : *Horne 353* and *Wright 102*, Seychelles, Mahe (K).
- *F. baronii* BAKER, J. Linn. Soc., Bot. 20 : 262 (1883) ; BAILLON in GRANDIDIER, Hist. Madagascar, Bot., Atlas 3 : tab. 300 (1895) ; H. PERRIER, Arch. Bot. Bull. Mens. 2 : 153 (1928), and in HUM-



Pl. 3. — *Ficus humbertii* C. C. Berg : 1, leafy twig ; 2, leafy twig with figs ; 3, ostiole ; 4, ostiolar bracts ; 5, staminate flower ; 6, seed flower ; 7, gall flower with interfloral bract. (1, 3-7, *Humbert 20239* ; 2, *Humbert & Swingle 5325*).

- BERT, Fl. Madagascar, Moracées : 54 (1921). Type : *Baron 1683*, Madagascar, without locality (holo-, K ; iso-, BM, P).
- *F. trichosphaera* BAKER, *l.c.* 20 : 262 (1883) ; H. PERRIER, *l.c.* : 153 (1928). Type : *Baker 1682*, Madagascar, without locality (holo-, K ; iso-, BM, P).
- *F. apodocephala* BAKER, *l.c.* 21 : 445 (1885) ; BAILLON in GRANDIDIER, *l.c.* : tab. 299 (1895) ; H. PERRIER, *l.c.* : 153 (1928). Type : *Baron 2521*, Madagascar, without locality (holo-, K ; iso-, BM, P).
- *F. pachyclada* BAKER, *l.c.* 25 : 345 (1890), non BAKER (1887) ; H. PERRIER, *l.c.* : 153 (1928). Type : *Baron 5162*, Madagascar, without locality (holo-, K ; iso-, P).
- *F. vestito-bracteata* WARB., Bot. Jahrb. 20 : 159 (1894). Lectotype : *Hildebrandt 1648*, Comoro Islands, Anjouan (B).
- *F. subcalcarata* WARB. var. *vestito-bracteata* (WARB.) MILDBR. & BURRET, Bot. Jahrb. 46 : 238 (1911).

OTHER SYNONYMS (based on material from continental Africa) : *Ficus akaie* De Wild., *F. arimensis* Britton, *F. cabrae* Warb., *F. holstii* Warb., *F. incognita* De Wild., *F. kaba* De Wild., *F. lanigera* Warb., *F. nekbudu* Warb., *F. neumannii* Kunth & Bouché, *F. pseudo-vogelii* A. Chev., *F. quebeba* Ficalho, *F. senegalensis* Miq., *F. subcalcarata* Warb., *F. utilis* Sim, *F. verrucocarpa* Warb., *F. vogelii* (Miq.) Miq., *F. vogelii* var. *pubicarpa* Mildbr. & Burret, *Urostigma neumannii* (Kunth & Bouché) Miq., *U. vogelii* Miq.

Tree up to 20 m tall. Leafy twigs 5-12(-20) mm thick, puberulous, white-, to yellow-tomentose to -subhirsute or glabrous, when dry brown, periderm flaking off. Leaves in spirals ; lamina elliptic to oblong to (sub)obovate, sometimes (ob)lanceolate, 7-25(-45) × 3-12(-20) cm, coriaceous, apex short-acuminate, base obtuse to acute or to subcordate, margin entire ; upper surface glabrous or minutely puberulous on the midrib, lower surface sparsely (to densely) puberulous to hirtellous to (sub)tomentose, on the main veins to subhirsute or entirely glabrous ; venation almost plane above, ± prominent beneath, lateral veins 2 × (4-)6-8(-10), basal pair not distinct, tertiary venation reticulate to partly scalariform ; petiole (1-)1.5-13(-17) cm long, 2-4(-8) mm thick, glabrous or white-pilose, epidermis flaking off ; stipules 0.5-2.5 cm (on flush up to 12 cm) long, sparsely to densely white- to yellowish-puberulous to -subsericeous, caducous.

Figs up to 4 together in the leaf axils or (just) below the leaves, sessile ; basal bracts broadly ovate to semicircular, 3-6 mm long, puberulous to strigose ; receptacle when dry 0.8-1.7 cm in diameter, puberulous, white-pubescent or (partly) yellowish-villous, at maturity yellow to orange to brownish ; wall when dry 1-2 mm thick ; ostiole plane.

Staminate flowers (sub)sessile ; tepals 3, free or basally connate, 1-1.2 mm long ; anther ca. 0.7 mm long. Pistillate flowers : tepals 3, basally connate, 1-1.5 mm long ; seed flowers sessile, style (including stigma) ca. 0.8-1.3 mm long ; gall flowers subsessile or up to 1.5 mm long pedicellate, style (including stigma) ca. 0.5-1 mm long. Fruits ellipsoid to subglobose, ca. 1 mm long, bicolourous ; "gall fruits" oblongoid to ellipsoid, 1.2-1.5 mm long. Interfloral bracts 1-1.5 mm long.

DISTRIBUTION : Madagascar and Comoro Islands, extending to the Aldabra Islands, the Seychelles, and the African continent (South Africa to Ethiopia and to Senegal) ; in forest, at altitudes up to 1400 m ; often planted.

COLLECTIONS EXAMINED. — COMORO ISLANDS : *Boivin 3110* ; *Humblot (1)156* ; *Lavanchie 4*. — MADAGASCAR : *Herb. d'Alleizette 275M* ; *Baron 1682, 1683, 2521, 5162, 5953, 5957, 5979* ; *Blommers 17* ; *Boivin 1719* ; *Bosser 12940* ; *Capuron 18773-SF, 28693-SF* ; *Cours 861, 1415, 2921* ; *Decary 1251,*

4735, 16978, 18280 ; Geay 8059 ; Herb. Jard. Bot. Tananarive 5435 ; Humbert (et al.) 2927, 3169, 4489, 6236, 12940, 17455, 19015 bis, 20163 ; Jacquemin 488.J, 1010 ; Jeffrey 1186 ; Lam & Meeuse 5516 ; Langley Kitching s.n. ; Mabberley 1009 ; McWhriter 39 ; Meller s.n. ; Perrier de la Bâthie 84, 84A, 84B, 84C, 10048, 12946, 12947, 12948, 13139, 13215, 13235, 13235 bis, 13255, 13330, 14106, 15887, 15888 ; Rés. Nat. Madag. 4585, 5610 ; Serv. Forest. Madag. 21, 1266, 3768, 4795, 16935 ; Seyrig 413.

18. *Ficus trichopoda* Baker

J. Linn. Soc., Bot. 20 : 261 (1883) ; H. PERRIER, Arch. Bot. Bull. Mens. 2 : 159 (1928), and in HUMBERT, Fl. Madagascar, Moracées : 59 (1952).

LECTOTYPE : *Baron 1663*, Madagascar, without locality (K ; iso-, B, BM).

SYNONYMS (based on material from continental Africa) : *Ficus buddensis* Hutch., *F. congensis* Engl., *F. congensis* var. *mollis* Hutch., *F. hippopotami* Gerstner, *F. zuvalensis* Sim. (Cf. Fl. Gabon, Moracées 26 : 152 (1984)).

Shrub or tree up to 10(-20) m tall, often with stilt-roots on the main branches. Leafy twigs 3-7 mm thick, glabrous or white-puberulous to -hirtellous, when dry brown to blackish with conspicuous lenticels, periderm persistent. Leaves in spirals ; lamina (broadly) ovate to elliptic, 6-20(-38) × 4-12(-32) cm, coriaceous, apex short-acuminate to obtuse, base obtuse to cordate, margin entire, ± revolute ; upper surface white-puberulous to -hirtellous on the main veins, glabrescent or entirely glabrous, lower surface densely white-hirtellous to -subtomentellous ; venation plane to ± prominent above, prominent beneath, lateral veins 2 × 7-11, tertiary venation partly scalariform ; petiole 2-4(-7) cm long, (1-)2-3 mm thick, glabrous or white-puberulous to -hirtellous ; stipules 1.5-4.5(-8) cm long, densely white-puberulous to -hirtellous, caducous.

Figs up to 4 together in the leaf axils ; peduncle 0.5-1 cm long, 1-2 mm thick, densely white-puberulous ; basal bracts broadly ovate to semicircular, ca. 2 mm long, ± densely white-puberulous ; receptacle (sub)globose, when fresh 1-2 cm, when dry 0.5-1.5 cm in diameter, glabrous to densely white-puberulous ± verruculose, at maturity red to yellowish ; wall when dry ca. 1 mm thick ; ostiole prominent.

Staminate flowers up to 0.5 mm long pedicellate ; tepals 3, basally connate, ca. 1 mm long, distinctly unequal ; filament ca. 0.3 mm long, anther ca. 0.5 mm long. Pistillate flowers : tepals 3, basally connate (or free), 0.5-2 mm long, distinctly unequal ; seed flowers (sub)sessile, style (including stigma) ca. 1.5 mm long ; gall flowers up to 1.5 mm long pedicellate, style (including stigma) ca. 0.5 mm long. Fruits ellipsoid, ca. 1 mm long, unicolourous ; "gall fruits" subobovoid, ca. 1.5 mm long. Interfloral bracts up to 2 mm long.

DISTRIBUTION : Madagascar, extending to South Africa and Senegal, possibly also in Mauritius (cf. BERG & VAN HEUSDEN, 1985) ; usually in marshy places, at altitudes up to 1100 m.

COLLECTIONS EXAMINED. — MADAGASCAR : *Herb. d'Alleizette 866M* ; *Baron 1655, 1663* ; *Bernier 255* ; *Blommers 3, 4* ; *Bosser 8134* ; *Capuron 897-SF* ; *Cours 1219* ; *Croat 28818* ; *Decary 14639, 14746* ; *Grandidier s.n.* ; *Humbert (et al.) 2983, 19665, 24379, 25618* ; *Perrier de la Bâthie 10067, 10072, 10078, 15674* ; *Viguiier & Humbert 435*.

19. *Ficus grevei* Baillon

In GRANDIDIER, *Hist. Madagascar, Bot., Atlas 3 : tab. 297, 298* (1895); H. PERRIER, *Arch. Bot. Bull. Mens. 2 : 162* (1928), and in HUMBERT, *Fl. Madagascar, Moracées : 62* (1952).

TYPE : *Hist. Madagascar, Bot., Atlas 3 : tab. 298* (1895); probably based on *Grevé 8 or 31, Madagascar (P)*.

Tree up to 20 (or more) m tall. Leafy twigs 2.5-6 mm thick, glabrous or minutely puberulous, when dry (dark) brown, periderm persistent. Leaves in spirals; lamina elliptic to ovate to subcordiform (or oblong to subovate), 6-16(-25) × 4.5-13.5(-16.5) cm, coriaceous, apex obtusely short-acuminate, base cordate to rounded, margin entire; upper surface glabrous or puberulous on the midrib, lower surface (sparsely) puberulous to hirtellous on the (main) veins, reticulum usually glabrous; venation above almost plane, beneath the midrib ± prominent, the other veins slightly prominent to plane, lateral veins 2 × 6-9, the basal pair slightly distinct, tertiary venation reticulate; petiole 2.5-8 cm long, 2-2.5(-3) mm thick, glabrous or sparsely puberulous to hirtellous, epidermis persistent; stipules (0.5-)1-6 cm long, glabrous or minutely puberulous, caducous.

Figs in pairs or solitary in the leaf axils or just below the leaves; peduncle 1-2 cm long, 1.5-2 mm thick, puberulous to hirtellous, sometimes cupula-like broadened at the apex; basal bracts caducous; receptacle (sub)globose, when dry (0.8-)1-1.7 cm in diameter, puberulous to hirtellous; wall when dry 0.5-1 mm thick; ostiole plane to slightly prominent.

Staminate flowers subsessile or up to 0.6 mm long pedicellate; tepals 3, free, ca. 1 mm long; filament short, anther ca. 0.6 mm long, connective thick. Pistillate flowers: tepals 3, free, 1.5-1.8 mm long, styles subterminally attached; seed flowers sessile, style (including stigma) ca. 1.5-2 mm long; gall flowers subsessile or up to 1.5 mm long pedicellate, style (including stigma) 0.5-1 mm long. Fruits ovoid to ellipsoid to subglobose, ca. 1-1.2 mm long, bicolourous; "gall fruits" obovoid to ellipsoid, ca. 2 mm long, ± distinctly stipitate. Interfloral bracts up to ca. 1.5 mm long.

DISTRIBUTION : Madagascar (mainly South-West); in dry forest, usually near water.

COLLECTIONS EXAMINED. — MADAGASCAR : *Baron 5339, 5395, 6423 ; Bernardi 11885 ; Boivin 2025, 2365 ; Bosser 15805 ; Decary 14112 ; Grandidier 9 ; Grevé 8, 31 ; Humbert (et al.) 2681, 5232, 5375, 11321, 11530, 12296, 12507, 12570, 19895 bis ; Perrier de la Bâthie 1100, 10051, 10064, 13246, 13477, 13477B, 13477C, 18797 ; Ursch 172.*

The identity of *Bernardi 11885* from Nossi-Bé is not quite certain.

20. *Ficus rubra* Vahl

Enum. 2 : 191 (1805), as a substitute name for *F. pyrifolia* Lam.

— *Urostigma rubrum* (VAHL) MIQ., *London J. Bot. 6 : 559* (1847).

— *Ficus pyrifolia* LAM., *Encycl. Bot. 2 : 497* (1788), non BURMAN (1768). Type : *Commerson s.n., La Réunion (holo-, P-LA)*.

- *F. avi-avi* BLUME, Bijdrage 1 : 446 (1825) ; FOSBERG & RENVOIZE, Kew Bull., Additional Ser., 7 : 272, tab. 44, fig. 1 (1980). Type : *Anonymus s.n.*, Madagascar, without locality (holo-, L).
- *F. consimilis* BAKER, Flora Mauritius and Seychelles : 286 (1877). Syntypes : *Wright s.n.* and *Horne 565*, Seychelles (K).
- *F. pyrifolia* LAM. var. *consimilis* (BAKER) H. PERRIER, Arch. Bot. Bull. Mens. 2 : 158 (1928), and in HUMBERT, Fl. Madagascar, Moracées : 58 (1952).
- *F. cinerea* CORDEM., Fl. Réunion : 272 (1895). Type : *Cordemoy s.n.*, La Réunion (holo-, MARS).

TYPE : *Commerson s.n.*, La Réunion (holo-, P-LA).

Tree up to 8 m tall. Leafy twigs 3-5 mm thick, glabrous or sometimes sparsely and minutely puberulous, when dry reddish-brown, periderm persistent. Leaves in spirals ; lamina ovate to subovate to (broadly) elliptic, 2.5-10(-16) × 1.5-6.5(-8) cm, (sub)coriaceous, apex obtuse to subacute or to short-acuminate, base rounded to truncate to acute or to emarginate, margin entire ; both surfaces glabrous ; midrib prominent, the other veins plane to slightly prominent ; lateral veins 2 × 6-10(-12), basal pair not or hardly distinct, tertiary venation reticulate ; petiole 0.7-4.5(-7) cm long, ca. 2 mm thick, glabrous ; stipules 0.3-1.5 cm (on flush up to 10 cm) long, glabrous, caducous.

Figs in pairs in the leaf axils or just below the leaves ; peduncle 0.2-0.8 cm long, minutely puberulous or glabrous ; basal bracts broadly ovate to semicircular, ca. 2 mm long, glabrous or minutely puberulous ; receptacle globose (to ellipsoid), when dry 0.6-1 cm in diameter, glabrous or minutely puberulous, at maturity (dark) red to (dark) purple ; wall when dry 0.5-1 mm thick ; ostiole plane to prominent.

Staminate flowers up to 0.8 mm long pedicellate ; tepals 3, (almost) free, ca. 1-1.3 mm long ; anther ca. 0.7-0.8 mm long ; pistillate flowers : tepals 3, (almost) free, ca. 1-1.5 mm long ; seed flowers sessile or up to 0.5 mm long pedicellate, style (including stigma) ca. 0.5-0.8 mm long ; gall flowers subsessile or up to 1.5 mm long pedicellate, style (including stigma) ca. 0.3-0.5 mm long. Fruits ovoid to ellipsoid, 0.8-1 mm long, (almost) unicolourous ; "gall fruits" ellipsoid to subglobose, ca. 1 mm long. Interfloral bracts ca. 1.5 mm long.

DISTRIBUTION : Madagascar (near Diego Suarez and Baie de Rigny), Comoro Islands, extending to the Aldabra Islands, the Seychelles, and the Mascarene Islands ; often in rocky places.

COLLECTION EXAMINED. — COMORO ISLANDS : *Boivin 3109*. — MADAGASCAR : *Anonymus s.n.* (type of *F. avi-avi*) ; *Boivin 2366* ; *Humbert 31974*.

21. *Ficus marmorata* Baker

J. Linn. Soc., Bot. 20 : 257 (1883) ; H. PERRIER, Arch. Bot. Bull. Mens. 2 : 152 (1928), and in HUMBERT, Fl. Madagascar, Moracées : 52, tab. 9, fig. 10, 11 (1952).

TYPE : *Bojer s.n.*, Madagascar, Baie de St Augustin (holo-, K, sub *Bouton s.n.*).

Tree up to 15 m tall. Leafy twigs 1.5-3 mm thick, (rather) densely puberulous, when dry brown to blackish, periderm persistent. Leaves in spirals ; lamina elliptic to lanceolate

or ovate to subovate, sometimes subovate, 2-8 × 1.2-4.5 cm, (sub)coriaceous, apex acuminate, base rounded to subcordate, margin entire; both surfaces glabrous; venation almost plane above, beneath only the midrib prominent, lateral veins 2 × (5-)7-10, basal pair hardly distinct, tertiary venation reticulate; petiole (0.8-)1.5-6 cm long, 0.5-1.5 mm thick, glabrous, epidermis persistent; stipules 0.5-1.5 cm (on flush up to 4 cm) long, (sub)glabrous, caducous.

Figs in pairs in the leaf axils or just below the leaves; peduncle 0.2-0.5 cm long, 0.5-1 mm thick, puberulous; basal bracts semicircular, ca. 2.5 mm long, sparsely puberulous, persistent; receptacle globose, when dry 0.5-0.8 cm in diameter, white-hirtellous to -puberulous, sometimes pusticulate; wall when dry 0.5 mm thick; ostiole plane.

Staminate flowers up to 0.7 mm long pedicellate; tepals 3, free, ca. 1 mm long; anther ca. 0.8 mm long. Pistillate flowers: tepals 3, free, ca. 1 mm long; seed flowers sessile or up to 0.4 mm long pedicellate, style (including stigma) ca. 1.2-1.5 mm long; gall flowers up to 1.2 mm long pedicellate, style (including stigma) ca. 0.8-1 mm long. Fruits ellipsoid to ovoid, ca. 1.5 mm long, bicolourous, (the endocarp body released); "gall fruits" ovate to ellipsoid to obovoid, ca. 1-1.2 mm long, bicolourous. Interfloral bracts a few, 0.5-0.7 mm long.

DISTRIBUTION: Madagascar (South-West and North); in forest.

COLLECTIONS EXAMINED. — MADAGASCAR: *Bojer s.n.* (as *Bouton s.n.* in K); *Blackburn s.n.*; *Bosser 374*; *Capuron 6480-SF, 8467-SF*; *Grevé 7*; *Humbert (et al.) 2576, 5197, 5340, 18942, 19924*; *Mabberley 562*; *Perrier de la Bâthie 2576, 10084, 12778, 13793, 13814*; *Serv. Forest. Madag. 1501*.

The species appears to be very closely related to *F. rubra*. In the treatment of *Ficus* for Fl. Madagascar *F. marmorata* was mixed up with *F. madagascariensis* (tab. 9, fig. 12) and *F. reflexa* (tab. 9, fig. 8, 9).

22. *Ficus bivalvata* H. Perrier

Arch. Bot. Bull. Mens. 2: 151 (1928), and in HUMBERT, Fl. Madagascar, Moracées: 50, tab. 9, fig. 1-6 (1952).

TYPE: *Perrier de la Bâthie 10013*, Madagascar, Tsaratanana (holo-, P; iso-, P).

Tree up to 30 m tall. Leafy twigs 2.5-4 mm thick, minutely puberulous, when dry brown, periderm persistent. Leaves in spirals; lamina oblong to elliptic, 4-9.5 × 2.5-5 cm, coriaceous, apex short-acuminate, base rounded to truncate to subcordate, margin entire; both surfaces glabrous; venation plane above, ± prominent beneath, lateral veins 2 × 10-12, basal pair not distinct, tertiary venation reticulate; petiole 0.5-1.6 cm long, ca. 2 mm thick, minutely puberulous; stipules 0.5-1 cm long, puberulous, caducous.

Figs in pairs in the leaf axils, subsessile or up to 0.4 cm long pedunculate; basal bracts caducous, leaving a discoid persistent part; receptacle ovoid to ellipsoid, when dry ca. 2-2.5 × 1-1.2 cm, puberulous to strigillose, pusticulate; wall when dry ca. 2 mm thick; ostiole prominent.

Staminate flowers up to 1 mm long pedicellate ; tepals 3, free, ca. 1 mm long ; anther ca. 1 mm long. Pistillate flowers : tepals 4, free, 1-1.8 mm long ; seed flowers sessile, style (including stigma) ca. 1.5-2 mm long ; gall flowers up to 2 mm long pedicellate, style (including stigma) ca. 0.5-0.7 mm long. Fruits ovoid to ellipsoid, ca. 1.5 mm long, (almost) unicolourous, (the endocarp body possibly released) ; “gall fruits” ellipsoid ca. 1.5 mm long. Interfloral bracts lanceolate to linear, 1.5-2 mm long.

DISTRIBUTION : Madagascar, only known from the type collection ; in forest at ca. 1700 m altitude.

23. **Ficus antandronarum** (H. Perrier) C. C. Berg, *stat. nov.*

— *Ficus pyrifolia* LAM. var. *antandronarum* H. PERRIER, Arch. Bot. Bull. Mens. 2 : 158 (1928), and in HUMBERT, Fl. Madagascar, Moracées : 58 (1952).

TYPE : *Perrier de la Bâthie 10056*, Madagascar, Analamahitso Forest (holo-, P).

Shrub or tree up to 20 m tall. Leafy twigs 2-3 mm thick, glabrous or minutely puberulous, when dry brown, periderm persistent. Leaves in spirals (or tending to distichous) ; lamina elliptic to oblong to (sub)obovate (or to suborbicular), 2-7 × 1.5-5 cm, coriaceous, apex short-acuminate to obtuse to subacute or to rounded, base acute to rounded, margin entire, often ± revolute ; both surfaces glabrous ; venation above (almost) plane, beneath ± prominent, lateral veins 2 × 4-8, basal pair ± distinct, tertiary venation reticulate ; petiole 0.3-1.5(-2) cm long, 1-1.5 mm thick, glabrous or minutely puberulous ; stipules 0.2-0.5 mm long, glabrous or minutely puberulous, caducous.

Figs in pairs in the leaf axils, subsessile or up to 0.4 mm long pedunculate ; basal bracts semicircular, 1.5-2.5 mm long, subglabrous ; receptacle when dry 0.4-0.5 or 0.7-1.3 cm in diameter, glabrous, when dry often dark brown to blackish ; wall when dry 0.5-2 mm thick, ostiole plane to prominent.

Staminate flowers sessile or up to 0.7 mm long pedicellate ; tepals 2 or 3 ; anther 0.6-0.8 mm long. Pistillate flowers : tepals 2-4, free, 0.6-0.8 mm long ; seed flowers sessile, style (including stigma) 0.7-1.5 mm long ; gall flowers subsessile or up to 1 mm long pedicellate, style (including stigma) ca. 0.5-0.8 mm long. Fruits ovoid to subglobose, 0.6-1 mm long, ± distinctly bicolourous ; “gall fruits” ellipsoid to ovoid, ca. 0.8-1.2 mm long. Interfloral bracts (sometimes very few) up to 2 mm long.

Two subspecies can be recognized :

a. Subsp. **antandronarum**

— *Ficus pyrifolia* LAM. var. *pedunculata* H. PERRIER, Arch. Bot. Bull. Mens. 2 : 158 (1928), and in HUMBERT, Fl. Madagascar, Moracées : 59 (1952). Type : *Perrier de la Bâthie 17072*, Madagascar, Onive River, Andaribe Forest (holo-, P).

Lamina usually elliptic to obovate, sometimes to suborbicular. Figs subsessile or up to 4 mm long pedunculate ; receptacle (0.7-)0.8-1.3 cm in diameter, when dry often dark

brown to blackish ; wall when dry ca. 1-2 mm thick. Staminate flowers pedicellate. Interfloral bracts numerous, up to 2 mm long.

DISTRIBUTION : Madagascar (East to Central) ; in forest and along streams ; at altitudes up to 1600 m.

COLLECTIONS EXAMINED. — MADAGASCAR : *Baron 6038* ; *Bernier 253* ; *Boivin 1718* ; *Capuron 18021-SF, 24147-SF* ; *Homolle s.n.* ; *Morat 4713* ; *Perrier de la Bâthie 17072* ; *Rés. Nat. Madag. 4257, 11025* ; *Serv. Forest. Madag. 2034, 4646, 17964, 25803* ; *Scott Elliot 2819*.

b. Subsp. **bernardii** C. C. Berg, *subsp. nov.* — Pl. 4.

Recedit subsp. antandronarum, inter alia, syconia minoribus.

TYPUS : *Bernardi 11653*, Comoro Islands, Grande Comore, Grill-Maoneni forest, 1.12.1957 (holo-, P ; iso-, K).

Lamina usually oblong to subobovate. Figs 0.2-0.3 mm long pedunculate ; receptacle when dry 0.4-0.5 cm in diameter ; wall when dry 0.1-0.2 mm thick. Staminate flowers sessile. Interfloral bracts (very) few, up to 1 mm long.

ADDITIONAL COLLECTIONS. — COMORO ISLANDS : *Humblot (1)160*, Mayotte, Mt. Bini, Maze forest, 2.5.1884 (K, P) ; *Ducatillon 432*, Anjouan, 17.10.1984 (U). In forest.

The two taxa might prove to be species rather than subspecies.

24. *Ficus reflexa* Thunb.

Diss. Bot. Ficus : 11 (1786) ; VAHL, Enum. 2 : 190 (1805).

- *Ficus punctata* LAM., Encycl. Bot. : 495 (1788), *non* THUNB. (1786).
- *F. aggregata* VAHL, *l.c.* : 191 (1805), as substitute name for *F. punctata* LAM.
- *Urostigma aggregatum* (VAHL) MIQ., London J. Bot. 6 : 599 (1847).
- *U. reflexum* (THUNB.) MIQ., *l.c.* : 569 (1847).

Shrub or tree up to 10 m tall. Leafy twigs 1.5-4(-8) mm thick, glabrous or puberulous, when dry dark (red-)brown, pale brown or greyish, periderm flaking off. Leaves in spirals ; lamina oblong to elliptic to (sub)obovate to (ob)lanceolate, 1.5-12 × 1-5(-5.5) cm, coriaceous, apex acute to rounded or short-acuminate, base acute to obtuse (emarginate with a notch narrower than the petiole), margin entire ; both surfaces glabrous ; venation above plane, beneath only the midrib ± prominent, lateral veins 2 × 5-11, basal pair not distinct, midrib often not reaching the apex of the lamina, tertiary venation reticulate ; petiole 0.3-3(-4) cm long, 1-2 mm thick, glabrous (or puberulous), stipules 0.5-1.5(-2) cm long, membranous, glabrous or sparsely and minutely puberulous, usually subsistent.

Figs in pairs in the leaf axils or just below the leaves, sessile ; basal bracts semicircular to broadly ovate, 1.5-2 mm long, puberulous to subglabrous ; receptacle (sub)globose, when dry 0.5-0.8(-1.2) cm in diameter, glabrous, minutely puberulous or sometimes tomentose, at maturity red to red-brown or to purplish ; wall when dry 0.5-1 mm thick ; ostiole plane to prominent.



Pl. 4. — *Ficus antandronarum* (H. Perrier) C. C. Berg subsp. *bernardii* C. C. Berg : 1, leafy twig with figs ; 2, staminate flower ; 3, seed flower ; 4, gall flower. (*Bernardi* 11653).

Staminate flowers (sub)sessile ; tepals 3 (or 4), free or basally connate, ca. 1-1.5 mm long ; filament ca. 1.5 mm long ; anther ca. 0.5 mm long. Pistillate flowers : tepals 3 (or 4), free or basally connate, ca. 1-1.5 mm long ; seed flowers sessile or up to 0.5 mm long pedicellate, style (including stigma) 0.5-1 mm long ; gall flowers up to 1 mm long pedicellate, style (including stigma) ca. 0.5 mm long. Fruits ovoid to subglobose, ca. 1 mm long, bicolourous ; “gall fruits” subglobose to obovoid, 1-1.5 mm long, \pm stipitate. Interfloral bracts ca. 1 mm long.

The above description is based on material from Madagascar and the Mascarene Islands, thus material of subsp. *reflexa*. This taxon is illustrated in Fl. Madagascar, Moracées, tab. 9, fig. 8, 9 (1952).

The taxa described as *F. aldabrensis* and *F. rubra* var. *seychellensis* can be included as subspecies in *F. reflexa*. *F. reflexa* appears to be closely related to the extremely variable, continental (complex-)species *F. thonningii* Blume. The differences between *F. reflexa* and *F. thonningii* are rather small, but they justify separation of the two species. Entomological data (WIEBES, 1975 ; BOUČEK, WATSHAM & WIEBES, 1981) appear to indicate different pollinators for the two species.

a. Subsp. *reflexa*

- *Ficus terebrata* WILLD., Sp. Pl. 4 (2) : 1145 (1806). Type : *Bory s.n.*, Mauritius (holo-, B).
- *Urostigma terebratum* (WILLD.) MIQ., London J. Bot. 6 : 558 (1847).
- *F. melleri* BAKER, J. Linn. Soc., Bot. 20 : 258 (1883). Lectotype : *Meller s.n.*, Madagascar, Tranomavo, between Tamatave and Antananarivo (K).
- *F. pyrifolia* LAM. var. *melleri* (BAKER) H. PERRIER, Arch. Bot. Bull. Mens. 2 : 155 (1928).
- *F. pyrifolia* LAM. var. *occidentalis* H. PERRIER, *l.c.* : 156 (1928), and in HUMBERT, Fl. Madagascar, Moracées : 57 (1952). Lectotype : *Perrier de la Bâthie 10024*, Madagascar, Betafo (P).
- *F. pyrifolia* LAM. var. *imerinensis* H. PERRIER, *l.c.* : 157 (1928), and in HUMBERT, *l.c.* : 58 (1952). Type : *Perrier de la Bâthie 13921*, Madagascar, Tananarive, planted (holo-, P).
- *F. pyrifolia* LAM. var. *tsaratananensis* H. PERRIER, *l.c.* : 158 (1928), and in HUMBERT, *l.c.* : 58 (1952). Type : *Perrier de la Bâthie 10034*, Madagascar, Tsaratanana Massif (holo-, P).

Leafy twigs glabrous or puberulous. Lamina 1.5-12 \times 1-5(-5.5) cm ; lateral veins 2 \times 5-11 ; stipules 0.5-1.2(-2) cm long, puberulous or only ciliolate, subpersistent. Figs sessile ; receptacle when dry 0.5-0.8(-1.2) cm in diameter, glabrous, puberulous, or tomentose.

DISTRIBUTION : Madagascar ; in various types of forest ; at altitudes up to 1400 m.

COLLECTIONS EXAMINED. — MADAGASCAR : *Herb. d'Alleizette 239M, 1017M ; Basse s.n. ; Baron 505, 515, 1015, 1049 ; Blommers 9 ; Boivin 2026* (in P mixed with *F. botryoides*), 2367, *s.n. ; Bosser 13061 ; Cours 532, 547, 728, 1220, 1419, 1466, 2602 ; Decary 4732, 5390, 6412, 8961, 8962, 10109, 10180, 13673, 14442, 16961, 16967, 17449, 17928, 18250, 18444 ; Geay 6736, 7288, 7289, 7592, 8095 ; Gerrard 31 ; Herb. Jard. Bot. Tananarive 2239, 2250, 2701 ; Homolle 723 ; Humbert (et al.) 2940, 5659, 5921, 6246, 13371, 17456, 19911, 24396 ; Keraudren 1239 ; Léandri 151, 592 ; Lyall 150 ; Maberley 1007 ; Meller *s.n.* ; Morat 3102 ; *Perrier de la Bâthie 614, 614 bis, 9954, 10024, 10031, 10034, 10054, 10065, 10079, 11841, 13149, 13242, 13248, 13248 bis, 13284A, 13284B, 13921 ; Scott Elliot 2455 ; Rés. Nat. Madag. 1019, 2342, 3859, 5373, 8147 ; Richard 112 ; Serv. Forest. Madag. 2342, 3769, 4215, 4783, 5956 ; Seyrig 414 ; Sylvain 1.**

b. Subsp. **sechellensis** (Baker) C. C. Berg, *stat. et comb. nov.*

- *Ficus rubra* VAHL var. *sechellensis* BAKER, Fl. Mauritius & Seychelles : 284 (1877).
- *F. sechellarum* SUMMERH., Kew Bull. 1928 : 393 (1928), as a substitute name for *F. rubra* VAHL var. *sechellensis* BAKER.

TYPE : *Wright s.n.*, Seychelles (holo-, K).

Leafy twigs glabrous. Lamina 4-17 × 1.3-4 cm ; lateral veins 2 × (6-)8-12 ; stipules 0.5-3 cm long, glabrous, caducous. Figs sessile ; receptacle when dry 0.4-0.7 cm in diameter, glabrous.

DISTRIBUTION : Seychelles.

c. Subsp. **aldabrensis** (Baker) C. C. Berg, *stat. et comb. nov.*

- *Ficus aldabrensis* BAKER, Kew Bull. 1894 : 151 (1894) ; FOSBERG & RENVOIZE, Kew Bull., Additional Ser., 7 : 273, *tab. 44, fig. 3* (1980).

TYPE : *Abbott s.n.*, Aldabra (holo-, K).

Leafy twigs glabrous or sometimes puberulous. Lamina 2-8.5(-11) × 1-4 cm ; lateral veins 2 × 5-8(-9) ; stipules 0.7-0.8(-1.5) cm long, minutely appressed-puberulous or only ciliolate, caducous. Figs subsessile or up to 0.15 cm long pedunculate ; receptacle when dry 0.4-0.6 cm in diameter, glabrous.

DISTRIBUTION : Comoro Islands (Anjouan, Mayotte) and Aldabra Islands.

COLLECTIONS EXAMINED. — COMORO ISLANDS : *Blackburn s.n.* ; *Boivin 3108* ; *Lavanchie s.n.*

25. ***Ficus polita*** Vahl

Enum. 2 : 182 (1805).

Subsp. ***polita***

- *Urostigma politum* (VAHL) MIQ., London J. Bot. 6 : 553 (1847).
- *Ficus megapoda* BAKER, J. Linn. Soc., Bot. 21 : 444 (1885) ; H. PERRIER, Arch. Bot. Bull. Mens. 2 : 161 (1928), and in HUMBERT, Fl. Madagascar, Moracées : 60 (1952). Lectotype : *Baron 3305*, Madagascar, without locality (holo-, K ; iso-, B, P).
- *Ficus podophylla* BAKER, *l.c.* : 444 (1885) ; H. PERRIER, *l.c.* : 161 (1928).

TYPE : *Baron 3323*, Madagascar, without locality (holo-, K ; iso-, P).

OTHER SYNONYMS (based on material from continental Africa) : *Ficus barombiensis* Warb., *F. niamniammensis* Warb., *F. syringifolia* Warb. (1894) *non* Kunth & Bouché (1847), *F. umbrosa* Sim.

Tree up to 15(-40) m tall. Leafy twigs 2-5 mm thick, glabrous or minutely yellowish-puberulous, glabrescent, when dry greyish, brownish, or blackish, lenticels often conspi-

cuous, periderm persistent. Leaves in spirals; lamina ovate to (almost) elliptic, 5-16 (-24) × 3.5-10(-15) cm, (sub)coriaceous, apex acuminate, base cordate to truncate, margin entire; both surfaces glabrous; venation plane above, ± prominent beneath, lateral veins 2 × 5-8(-9), basal pair ± (faintly) branched, tertiary venation reticulate; petiole 2-12 cm long, 1-2 mm thick, glabrous; stipules 0.5-2 mm long, glabrous, caducous.

Figs up to 4 together on up to 3 cm long spurs on the older wood; peduncle 1-2 cm long, 1-3 mm thick, puberulous; basal bracts ovate, 2-3 mm long, puberulous; receptacle globose to obovoid (when dry often ± stipitate), when fresh (2-)3-4 cm, when dry (1.5-)2-4 cm in diameter, puberulous, at maturity greenish to purplish; wall when dry 2-3 mm thick, wrinkled; ostiole prominent.

Staminate flowers 1-1.5 mm long pedicellate; tepals 2 (or 3?), free, 1.5-2 mm long; filament ca. 1 mm long, anther ca. 1 mm long. Pistillate flowers: tepals 2 (or 3?), free, ca. 1-2 mm long; seed flowers sessile or up to 1 mm long pedicellate, style (including stigma) 2-3.5 mm long; gall flowers 2-3.5 mm long pedicellate, style (including stigma) ca. 0.5 mm long. Fruits ellipsoid, 1.5-2 mm long, pericarp partly mucilaginous, endocarp body released; "gall fruits" obovoid to ellipsoid, 4-5 mm long, 2.5-3 mm long stipitate. Interfloral bracts 1.5-2 mm long.

DISTRIBUTION: Madagascar (West to Central); in (dry) forest and riversides.

COLLECTIONS EXAMINED. — MADAGASCAR: Herb. d'Alleizette 1210M; Baron 2536, 3305, 3323; Blommers 6, 10, 11, 12; Capuron 28324-SF; Cours 1190; Decary 5031, 14627; Grevé s.n.; Herb. Jard. Bot. Tananarive 4347D; Humbert 19939; Jacquemin 919 bis; Keraudren 305; Léandri et al. 4492; McWhriter 192; Perrier de la Bâthie 10041, 10049, 10050, 10083, 10089, 11839, 12944, 15697, 15889; Serv. Forest. Madag. 15, 1323, 13605.

The material from Madagascar belongs to the wide-spread subsp. *polita*. The other subspecies occurs in some montane areas in East Africa.

KEY TO THE FICUS SPECIES OF MADAGASCAR AND THE COMORO ISLANDS

1. Ostiole circular, at least three ostiolar bracts visible, only the lower or none of the ostiolar bracts descending. 2
- Ostiole slit-shaped, all ostiolar bracts descending. 21
2. Stipules not fully amplexicaul; bracts (2-4) below the receptacle usually spread on the peduncle; dioecious trees or shrubs (sect. *Sycidium*). 3
- Stipules fully amplexicaul; bracts (2 or 3) below the receptacle in a whorl; monoecious trees or shrubs. 9
3. Lamina hirtellous (to puberulous) beneath. 4
- Lamina hispidulous beneath. 7
4. Hairs on the leafy twigs (partly) brown with ± swollen bases; glandular spots on or for the greater part on the base of the midrib beneath. 3. *F. brachyclada*
- Hairs on the leafy twigs white or if brownish, then without swollen bases; glandular spots in the axils of the (main) basal lateral veins beneath. 5
5. Base of the lamina cordate or subcordate and/or the petiole 2.5-5(-13) cm long. 1. *F. pachyclada*
- Base of the lamina acute to obtuse or the petiole up to 1 cm long. 6

6. Lamina usually up to 10 cm long or, if longer, then mostly sublinear or lobed ; figs when dry 0.5-0.8(-1) cm in diameter, usually in the leaf axils or just below the leaves..... 4. *F. politoria*
 — Lamina usually longer than 10 cm and usually obovate to subobovate ; figs when dry 0.8-1.2 cm in diameter, often on spur-like branchlets (already formed in the leaf axils) on the older wood.... 3. *F. brachyclada*
7. Lamina usually subobovate to obovate ; glandular spots on or for the greater part on the midrib beneath ; figs mostly on spur-like branchlets (already formed in the leaf axils) on the older wood..... 3. *F. brachyclada*
 — Lamina usually elliptic to oblong or ovate to subovate ; glandular spots in the axils of the (main) basal lateral veins beneath ; figs in the leaf axils or just below the leaves..... 8
8. Lamina usually up to 10 cm long, if longer, then sublinear or lobed ; gall fruits stipitate (Madagascar)..... 4. *F. politoria*
 — Lamina usually longer than 10 cm ; gall fruits not stipitate (Comoro Islands and Madagascar : Nossi-Bé and near Diego Suarez)..... 2. *F. bojeri*
9. Figs usually solitary in the leaf axils or on branchlets on the older wood ; staminate flowers subtended (and enclosed) by two bract(eole)s ; stamens (usually) 2 (subg. *Sycomorus*)..... 10
 — Figs usually in pairs in the leaf axils or just below the leaves ; staminate flowers not subtended by two bract(eole)s ; stamen (usually) 1..... 17
10. Indument of the leafy twigs (partly) brown..... 7. *F. torrentium*
 — Indument of the leafy twigs whitish or yellowish..... 11
11. Basal lateral veins branched..... 12
 — Basal lateral veins unbranched..... 14
12. Stipules glabrous or sparsely puberulous ; receptacle when dry 0.8-1 cm in diameter ; only 3 or 4 ostiolar bracts visible..... 11. *F. karthalensis*
 — Stipules subsericeous to subhirsute ; receptacle when dry (1-)1.5-2.5 cm in diameter ; several ostiolar bracts visible..... 13
13. Apex of the lamina short-acuminate to subacute ; petiole up to 9(-13) cm long ; figs in the leaf axils or also on branchlets on the older wood, 1.5-2.5 cm in diameter..... 6. *F. tiliifolia*
 — Apex of the lamina rounded ; petiole up to 3 cm long ; figs on branchlets on the older wood, if in the leaf axils or just below the leaf, then 4-5 cm in diameter..... 5. *F. sycomorus*
14. Figs when dry 0.8-1 cm in diameter, only 3 or 4 ostiolar bracts visible..... 11. *F. karthalensis*
 — Figs when dry (1.2-)1.5-2.5 cm in diameter, more than 4 ostiolar bracts visible..... 15
15. Figs on branchlets on the older wood (0.7-)1-2.5(-7) cm long pedunculate ; basal bracts ca. 4 mm long. 9. *F. botryoides*
 — Figs axillary (or also on branchlets on the older wood), sessile or up to 0.8 cm long pedunculate ; basal bracts 1.5-3 mm long..... 16
16. Lateral veins $2 \times (3-)5-8$; periderm of the leafy twigs not flaking off ; figs sessile or up to 0.4 cm long pedunculate, not stipitate ; basal bracts 2-3 mm long ; lenticels few, large, in the upper part of the internodes..... 8. *F. polyphlebia*
 — Lateral veins $2 \times (5-)8-10(-11)$; periderm of the leafy twigs flaking off ; figs 0.4-0.8 cm long pedunculate, often stipitate ; basal bracts 1.5-2 mm long ; lenticels inconspicuous and disperse.... 10. *F. trichoclada*
17. Lenticels concentrated in the uppermost part of the internodes ; stigmas 2 (subg. *Pharmacosycea* sect. *Oreosycea*). 18
 — Lenticels (if present) disperse ; stigma 1 (subg. *Urostigma* sect. *Urostigma* and sect. *Conosycea*). 19
18. Apex of the lamina acute to faintly acuminate ; lateral veins $2 \times 7-14$ 12. *F. assimilis*
 — Apex of the lamina rounded to obtuse or very shortly and obtusely acuminate ; lateral veins $2 \times 6-8$ 13. *F. ampana*
19. Figs pedunculate..... 16. *F. humbertii*
 — Figs sessile. 20
20. Lateral veins $2 \times (3-)12-22$; petiole 0.5-2 cm long ; fruits yellowish ; interfloral bracts present.... 15. *F. menabeensis*
 — Lateral veins $2 \times 7-12$; petiole 0.5-5 cm long ; fruits brown ; interfloral bracts lacking..... 14. *F. madagascariensis*

21. Figs ovoid to ellipsoid..... 22. *F. bivalvata*
 — Figs (sub)globose or obovoid..... 22
 22. Figs sessile (or subsessile, peduncle at most 1.5 mm long)..... 23
 — Figs pedunculate (peduncle at least 2 mm long)..... 25
 23. Petiole (1.5-)4-13(-17) cm long, 2-4 mm thick, its epidermis flaking off..... 17. *F. lutea*
 — Petiole 0.3-3(-4) cm long, 1-2 mm thick, its epidermis persistent..... 24
 24. Stipules 0.2-0.5 cm long, caducous; lamina usually elliptic to obovate; figs when dry 0.8-1.3 cm
 in diameter and usually dark brown to blackish. 23 a. *F. antandronarum* subsp. *antandronarum*
 — Stipules 0.5-2 cm long, usually subpersistent; lamina usually oblong to subobovate; figs when
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 25. Figs on spurs on the older wood, when dry (1-)2-4 cm in diameter..... 25. *F. polita*
 — Figs axillary or just below the leaves, when dry up to 1.5 cm in diameter..... 26
 26. Basal bracts caducous..... 19. *F. grevei*
 — Basal bracts persistent..... 27
 27. Stipules 0.2-0.5 cm long; petiole up to 2 cm long..... 28
 — Stipules 0.5-1.5 cm long; petiole up to 7 cm long..... 29
 28. Figs when dry 0.4-0.5 cm in diameter; lamina oblong (or subobovate).....
 23 b. *F. antandronarum* subsp. *bernardii*
 — Figs when dry 0.7-1.3 cm in diameter; lamina elliptic to obovate.....
 23 a. *F. antandronarum* subsp. *antandronarum*
 29. Stipules densely puberulous to hirtellous..... 18. *F. trichopoda*
 — Stipules glabrous..... 30
 30. Leafy twigs 3-5 mm thick, glabrous (or minutely puberulous); apex of the lamina obtuse, sub-
 acute, or short-acuminate; figs when dry 0.6-1 cm in diameter, glabrous (or minutely puberulous).
 20. *F. rubra*
 — Leafy twigs 1.5-3 mm thick, densely puberulous; apex of the lamina ± distinctly and often long-
 acuminate; figs when dry 0.2-0.8 cm in diameter, puberulous to hirtellous.... 21. *F. marmorata*

CULTIVATED SPECIES :

- *F. carica* L.
 — *F. elastica* Roxb.
 — *F. pumila* L. This species was described by PERRIER DE LA BÂTHIE (Arch. Bot.
 Bull. Mens. 2 : 144, 1928) as *F. longipedicellata* from material collected in a parc in Tama-
 tave.

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